THE ENGINEERING AND MINING JOURNAL.

VOL. X.—NO. 5.—THIRD SERIES.] NEW YORK, TUESDAY, AUGUST 2, 1870. [SINGLE COPIES 10 CENTS.

An Ammonia Engine.

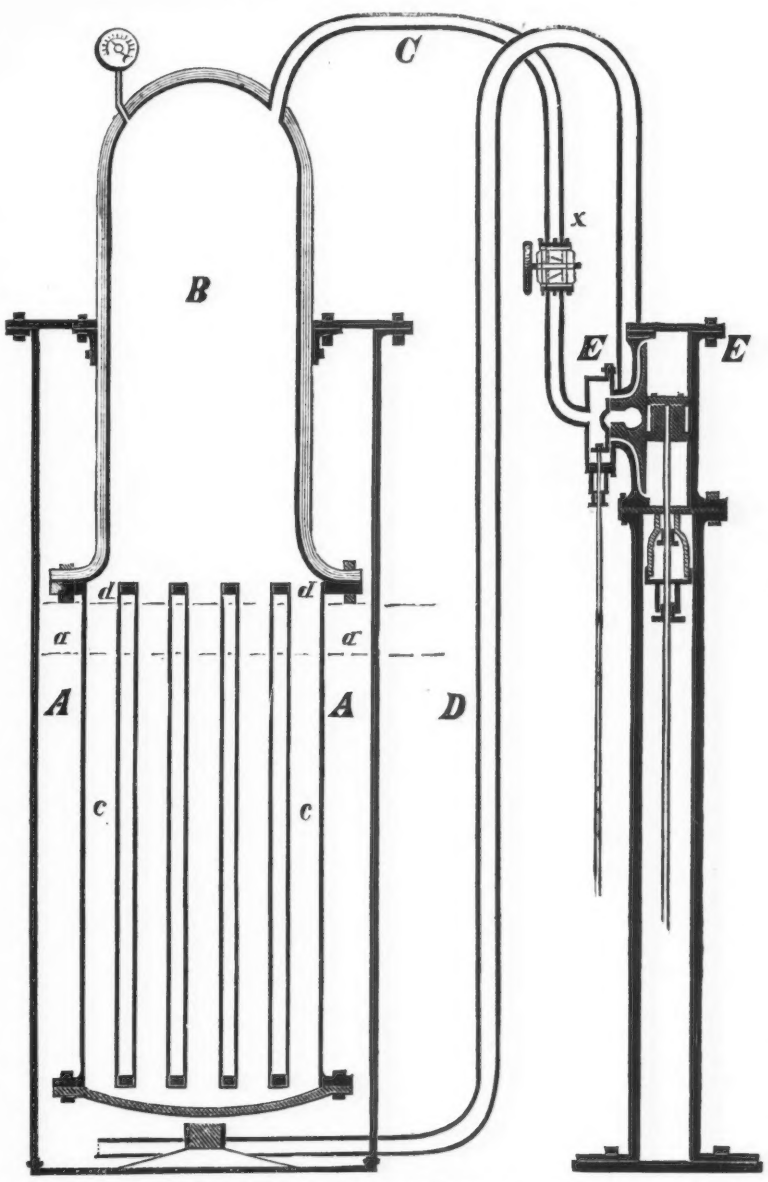
WE have become so accustomed to the use of the vapor of water (steam) as an agent for the conversion of heat into motion that we seldom think of the possibility of using any other gas for this purpose. The use of heated air has been already proved a comparative failure in this respect, except for very small engines. We now present to our readers a cut and description of an engine designed by Mr. EMILE LAMM, in which ammoniacal gas is used as a substitute for steam or air. Ammonia, at the temperature of our atmosphere, is a permanent gas of well-known pungent odor. It is formed by the union of three volumes of hydrogen to one of nitrogen, condensed into two volumes. Its density is 596; air being 1,000. The density of the liquid, compared with water, is 76, or about one-quarter lighter than that liquid. Its vapor, at 60° Fahrenheit, gives a pressure of 100 pounds to the square inch, while water, to give an equivalent pressure, must be heated to 325° Fahrenheit. The volume of ammoniacal gas under the above-named pressure is 983 times greater than the space occupied by its liquid, while steam, under identical pressure, occupies a space only 303 times greater than water.

The above figures are taken from a work published in Paris by the editors of the Annals of Civil Engineering, and have been substantiated in a lecture delivered by Mr. POULLET, before the French Academy of Sciences, on the apparatus of Carré, for making ice by means of liquified ammonia. I refer to the above authorities for this reason; that, if by the application of equal quantities of heat to the specific heat of equal weights of steam and ammonia, such great difference in their relative volume is produced, it is evident that the cost of ammonia, as a motive power, would be one-third that of steam.

In experimenting with ammonia, as a motive power, in propelling street cars, it was impossible to attain such a degree of economy, owing to the imperfection of the liquefying process, where there was only a transitory application of heat, by means of a charcoal furnace in the open air instead of a continuous process by means of steam. The development of power, however, by the quantity liquefied and used for experiments so far, gives undoubted assurance that the economy over steam would be in the proportion of their relative volumes, or as 983 is to 303, without taking into consideration the fact that it does not require skillful management, and the durability of apparatus in consequence of an utter absence of injurious temperatures.

This immense volume of the gas compared to other gas or vapors, shows a decided exception to the law of Mariotte, relating to the expansion of gases, greatly in favor of ammonia as a motive power. The latent heat of ammoniacal gas is 880, that of steam being 990. Ammonia is a powerful alkali. It rivals potassa and soda, and can neutralize the most powerful acids. Its action upon most of the metals is null; still, strange enough, it acts slowly upon one of the metals of the second class—i. e., copper. Upon metallic iron, which is a metal of the third class, its action is absolutely null; but readily dissolves carbonated oxide (iron rust.) Ammoniacal gas is absorbed by water with avidity—one volume of water at 70° Fahrenheit absorbing 500 volumes of the gas. The water becomes specifically lighter, whilst its volume is being augmented about one-third. As the absorption of the gas goes on, the water becomes heated, and the latent heat of the gas reappears as sensible heat. It is in this property that water posseses of absorbing so large an amount of the gas, and of becoming heated while absorbing it, that the practicability of using ammoniacal gas as a motive power rests, for it must be well borne in mind that the only agency for producing motive power is heat. It matters very little that liquified ammoniacal gas boils at 40° below zero—72° below the freezing point; it requires as much heat comparatively as water itself, for its complete and rapid evaporation, when acting as a motive power in an ordinary engine. However, we perceive a very great difference on touching the boiler of liquid ammonia, when acting on the piston of an engine with a force of 150 pounds to the square inch, and a steam boiler under the same pressure. The boiler of ammonia does not feel warmer than this desk or table, at this present time, while the steam-boiler would, under the same pressure, feel absolutely unbearable to the touch.

To comprehend fully the relation of heat to matter, some degree of mental application is necessary, for the first impressions created by our senses are liable to be erroneous. The insurmountable difficulty, hitherto, in the way of using liquefied gases as a motive power, has been the impossibility of supplying, without a recourse to artificial means, the heat necessary to convert their liquids into vapor. The point at which such a liquid may boil below the common temperature, making but little difference practically between the heat necessary to evaporate a given amount of water into steam, which boils at 212° Fahrenheit, and one that boils at 40° minus, such as ammonia, the real and only difference, comparatively, being that of radiation in favor of the liquid which boils at 40° minus, this radiation in summer being 120°, while the radiation against the evaporation of water would be 132° Fahrenheit. And even the above differences are more apparent than real, for they would only exist at the start, or when artificial heat would begin to be applied; for we all know that our atmosphere radiates heat extremely slowly. For example, we have but to observe the fact how slowly a piece of ice melts, when exposed to the air; this is owing to the great amount of heat absorbed during the process of liquefaction, and which mere radiation from the heat of our atmosphere is unable, even on the hottest day of summer, to supply rapidly. How much more heat, then, is required to convert a liquid into a vapor, need not be dwelt upon; and hence the absolute necessity of finding, even with liquids of very low boiling point, a means of heating other than the atmosphere in order to supply the heat necessary to their practical application for the production of power in lieu of steam; for if it was necessary to heat ammonia on a street car, by means of a furnace, ammonia, then, would offer but little advantage over steam.



MR. EMILE LAMM'S AMMONIA ENGINE.

But ammoniacal gas possesses the remarkable property, from its affinity for water, of being able at any time after its condensation into a liquid to reproduce at a distance from the furnace and still where it was condensed a force equal to the heat which was necessary for its condensation. This reproduction is owing to the fact that the latent heat of the gas appears anew in water of reabsorption, and is retransferred to the liquified gas. The retransfer of the heat to the liquefied gas takes place, through metallic tubes of which the reservoir is composed, from the water of reabsorption which surrounds them, and is similar in its operation to the action of fire in the furnace of a steam boiler.

By reference to the plate, the arrangement above spoken of will be easily understood; *c c* is the ammonia reservoir filled with liquefied ammoniacal gas to the line *d d*. A A is the tank filled with weak ammoniacal water to the line *a a*. C is the pressure-pipe, leading to the engine E E. D is the exhaust pipe leading from the engine to the water in the bottom of the tank A A. Now, when by means of the throttle valve *x*, the gas in the reservoir B is permitted to act on the piston of the engine through the pressure pipe C, the engine begins to work with a force equal to 150 lbs. to the square inch, at the temperature of 90° Fahrenheit, consequently the whole apparatus must remain at 90° Fahrenheit to give an effective pressure of 10 atmospheres for any given time that may be desired. In the last trip of seven miles made by a street car driven by ammonia, the engine used on the car was equal to two horse power, the ammonia expended during the trip amounted to 1.16 cubic feet. The latent heat of ammoniacal gas being 880, the whole heat expended during the trip would have been sufficient to raise 84 gallons of water from the temperature of 83° Fahrenheit to the boiling point 212°. If for supplying this heat it was necessary to rely upon the heat absorbed from our atmosphere, even on the hottest day of summer, I am positive that a car loaded with passengers could not run more than three hundred yards without being obliged to stop, and wait at least fifteen or twenty minutes, in order to acquire sufficient heat from the atmosphere to again run an equal distance. Now, if you will please give me a moment of close attention, I will show you wherein is the gist of the whole invention. The exhaust pipe, you will perceive, leads into an outside shell, or water tank, in which is immersed the reservoir containing the liquified gas. This ammoniacal gas escaping from the exhaust pipe, after having acted upon the piston of the engine, as soon as it comes in contact with the water in the tank, is instantly reabsorbed, giving out at the same time the heat which was rendered latent by its evaporation in the reservoir *c c*, and since both the latent heat of a vapor and the sensible heat which it gives back, when condensed into a liquid again, are equal in quantity, there is really no heat lost in the apparatus while the engine is working, except the mechanical equivalent of the power produced, but a continual retransfer of sensible heat goes on to supply the heat which is rendered latent by evaporation. This retransfer of heat is not instantaneous, and to overcome the delay in the communication of heat between the continually cooling liquefied gas, and the water becoming as quickly warm on the outside of the reservoir, it was necessary to construct a boiler of numerous tubes, so as to multiply the heating surfaces. To obtain the dynamical effect of a gas or vapor, all of the latent heat which may be extracted from it must be added to it as sensible heat. For example, if a volume of air be taken at the existing temperature, and compressed into one-half of the space it occupied orignally, it will become hotter, and the degrees of heat indicated by the thermometer above the common temperature shall be the equivalent of the force of compression. Now, if this same volume of air, compressed into one-half its original bulk, be allowed to cool until it is in equilibrium with the surrounding objects, it will have lost much of its tension, and the original tension or force of the air, existing at the moment immediately following compression, can only be given back to it by heating artificially above the com-

mon temperature to the same degree of heat it possessed immediately after compression. The force which a given quantity of liquefied ammonia (contained in a reservoir) exerts upon the piston of an engine in developing one horse power, for an hour, at the temperature of 60° Fah., provided it be kept up, is equal to the heat necessary to distil the same quantity of ammoniacal gas from the solution of aqua ammonia under a pressure of 100 lbs. to the square inch, at a temperature of 212° in the boiler and 60° Fah. in the liquefier.

It can be laid down as an invariable principle that the same cause (circumstances remaining the same) produces the same result. But what are the circumstances of ammonia compared with steam? Both steam and ammonia are governed by a law, (the law of Mariotte,) which is essentially the same for all gases, viz., that all gases or vapors expand equally by the same degree of heat added to their specific heat.

The mechanical equivalent of heat expended in working the engine by ammoniacal gas, one-seventh of the total heat, according to the best physicist, is fully made up by the extra heat of chemical combination becoming also sensible at the instant of the re-absorption of the gas in the water surrounding the tubes. The register of the pressure-gauge at the moment of starting, and during the trip, shows conclusively that the extra heat compensates all losses. The mean pressure during a trip remains essentially the same, if we take into account the time necessary for the transmission or equalization of heat between the reservoir containing the liquid gas and the reabsorbing water in which it is immersed. On the last trip made with a street-car, the gauge registered at the start 150 pounds, lost in pressure in making one and one-half miles, 30 pounds, gauge then registering 120 pounds. Upon stopping for ten minutes it registered 180 pounds, thus gaining 60 pounds. On stopping at the end of the trip of seven miles, the gauge remained stationary at 176 pounds. The above variations can easily be explained. It is impossible to construct an apparatus in which the transmission of heat would be instantaneous; therefore, in rapid travelling, the reservoir of liquid ammonia becomes cooler than the water of re-absorption outside; but the difference never exceeds a certain point either way, the extreme of which, in the last trip, starting with 150 pounds, was a difference of 45 pounds. The maximum of pressure during one of the warmest days of summer was then 195 pounds. When the reflection is made that this tension was exerted in a boiler, which stood 600 pounds hydraulic pressure, no other commentary is necessary as to its entire freedom from danger; and this is easily explained, for as the temperature between the reservoir of liquefied ammonia and the water of reabsorption diverges, the transmission of heat becomes more or less rapid, in the direct ratio of their degree of divergence; on this principle, that the production of heat in the reabsorbing water is equal to its reduction by evaporation in the reservoir of liquefied gas.

One other advantage which ammonia possesses over steam, is the fact that its vapor, not being condensed at the usual temperature of our atmosphere, does not, like steam, at a low temperature, suffer condensation either in the cylinder of the engine, or when used at a distance from the boiler. The last remark leads me to speak of the cheapness of ammonia as a motive power, especially where only one or two-horse power is required—such as on street cars. Its cheapness, when compared with steam, is owing to the fact that one steam-engine, if it could be made to propel one hundred street cars with ease, would be much cheaper than one hundred steam engines, each requiring a separate fire and an engineer, besides the regular conductor of the car; but the case is far different with ammonia, as a single engineer at the station can superintend the supplying of two hundred cars with liquefied ammonia in sufficient quantity to run any distance within the limits of a large city, by means of a single fire under the stationary boiler in which the ammoniacal gas is liquefied. Further, liquefied ammonia can be compared, if I may be permitted the expression, to a bottled-up power, which can remain in a reservoir for months or even years, and be transported any where in any desirable quantity; and then, at once, without any further preparation, can be used for any purpose desired; and by the simple turning of a faucet can be made to act as powerfully as when first liquefied.

Practically, a large central depot could be cheaply erected, with apparatus of capacity to liquefy a quantity of ammoniacal gas sufficient to propel all the street cars of a large city or other machinery. In thus indicating, in a general manner, the various applications of ammonia as a motive power, I must not forget to point out some other advantages which render it commendable:

First: Its perfect safety—for the reason that its power is exerted at a very low temperature, and consequently its influence in weakening the tenacity of the iron vessel containing it is trifling, when compared with the destructive effects of a high temperature. For it is a fact, known beyond dispute, that the main agency which causes those frequent and deplorable explosions of steam-boilers, is the high heat they require for the production of an effective force. Second: For marine purposes, I have no doubt that it will conquer for itself a high place before long, for this reason—that with an initial pressure of twenty pounds or twenty-five pounds in a boiler, it would give an effective pressure of one hundred and fifty pounds on the pistons of the engine. The estimated cost of constructing and erecting machinery necessary to propel twenty-five street cars by ammonia is $23,500. The cost per day of maintaining liquefying process at station, and charging twenty-five cars, each car making seventy-two miles per day, is estimated at $25.

We will here remark that the per centage of loss in ammoniacal gas, at the Louisiana Ice Manufacturing Company, for one year, amounts to 25 per cent. This loss will appear very small when it is considered that for the greater portion of the year they are obliged to liquefy under a pressure of 225 pounds to the square inch. This is owing to the high temperature of the water in the liquefier, which attains in New Orleans in summer the temperature of at least 90° Fahrenheit.

Analysis of Some Hitherto-Undetermined American Minerals.

By PROFESSOR LEEDS.

I.

A GREENISH-WHITE, translucent, compact mineral, from VAN ARSDALE'S quarry, near Attleboro', Bucks county, Pa., previously regarded as ekebergite.

Specific Gravity, 2.71.

PERCENTAGE COMPOSITION.

SiO_2	47.47
Al_2O_2	27.51
Fe_2O_3	tr.
MgO	1.20
CaO	17.59
Na_2O	3.05
K_2O	1.40
H_2O	1.48
	99.70

The atomic ratio, obtained by multiplying the quotients of these percents by the atomic weights into the quantivalences of the radicals, is:

Si	$0.79 \times 4 = 3.16$	3.16	or 12
$[Al_2]$	$0.27 \times 6 = 1.62$	1.62	6
Mg	$0.03 \times 2 = 0.06$		
Ca	$0.31 \times 2 = 0.62$		
Na_2	$0.05 \times 2 = 0.10$		
K_2	$0.015 \times 2 = 0.03$		
H_2	$0.08 \times 2 = 0.16$	0.97	4

Excluding the percentage of water, as has been done hitherto in the computation of the formulæ of these and analogous silicates, we have for the atomic ratio, 1 : 2 : 4. If we deduct the amount of Si corresponding to the H_2, regarding the matter as existing in the mineral, in the form of hydrate of silicic acid, we again have the ratio, 4 : 6 : 12, and the formula, $(Ca, Na_2)_2 [Al_2] Si_3 O_{10}$. And the mineral is scapolite.

The same mineral is found in the locality mentioned above, in imperfect crystals with rough faces. It is associated with pyroxene, graphite, sphene and phlogopite in granular limestone.

II.

A variety of orthoclase, which is described by I. LEA as being of a dull bluish-green color, and semi-transparent, with very minute crystalline hexagonal plates disseminated through the mass, and giving out very bright reflections. These plates may be seen with the naked eye. The name proposed for this variety was "Cassinite." It is found in a ploughed field on a serpentine ridge, known as Blue Hill, in Upper Providence township, Delaware county, Pa., four miles north-west of Media.

PERCENTAGE COMPOSITION.

SiO_2	64.20
Al_2O_3	19.69
Fe_2O_3	0 69
CaO	2.27
MgO	0.15
K_2O	9.59
Na_2O	3.43
Ign.	0.27
	100.29

Its formula is $(K_2, N_2) [Al_2] Si_6, O_{16}$, the same as common orthoclase.

III.

A yellowish-white mineral, with rombohedral cleavage and vitreous lustre, occurring imbedded in steatite. It is associated with a ferruginous dolomite, and often intermixed with it; becomes brown on exposure. It is found at the soapstone quarry on the north-east bank of the Schuylkill river, on the line between Philadelphia and Montgomery counties, Pa.

PERCENTAGE COMPOSITION AS GIVEN BY THE MEAN OF TWO ANALYSES.

MgO	38.43
FeO	10.39
CaO	3.29
CO_2	47.96
	100.07

It is to be regarded, therefore, as a ferriferous magnesite, or breunerite.

My thanks are due to Mr. THEODORE D. RAND, who obtained the specimens of these three minerals at the localities, and kindly presented them to me for analysis.—*Journal of Franklin Institute.*

The Coal Fields of Rio Grande do Sul, Brazil.

By ROBERT HEUSCHKEL, M. E.

THE Brazilian province, Rio Grande do Sul, is situated between the twenty-seventh and thirty-fourth degree of latitude, south, and 5° 45′ and 14° 40′ longitude, west of Rio de Janeiro. The country presents a hilly, rather than a mountainous appearance. The lowland portion of this part of the empire is a vast alluvial plain, and stretches from the southern end of the province Santa Catharina, from the southern spurs of the Serra Araringa, the prolongation of the Serra do Mar, along the entire sea-coast, and is terminated finally by the Serra Geral, where this chain slopes down to the sea near Maldonado, east of Montevidéo. In this alluvial plain lie the two large inland lakes, Lagoa dos Patos, and Lagoa Mirim. They are connected by the Rio Gonzalo, and their embouchure into the sea is near the town of Rio Grande do São Pedro do Sul, under latitude 32° 10′ south. Besides these two large lakes, the Lagoa da Mangueira in the southern part of the province, and the Lagoa dos Barros in the northern portion, deserve mentioning. The outline of the province presents the shape of a rhomb, the southernmost point of which lies near the southern end of the Lagoa Mirim. From here the boundary runs in a northwesterly direction up the Rio Jaguarão, and after crossing the Coxilha Grande it follows the ridge of the Serrilhada, the Coxilha da Santa Anna, and the Coxilha da Haéda to the Rio Quaraim, along which it runs to the Rio Uruguay. This it follows northeasterly to the mouth of the Rio Varzea; here the Uruguay changes its direction and is known by the name of Rio Pelotas, which has its source in the above mentioned Serra Araringa and forms the boundary in this direction. The line runs along the mountains to the seashore, and thence southwesterly to our starting point on the Lagoa do Mirim.

The accurate internal topography of the province is not determined, and neither exact surveys nor other reliable accounts have ever been published. Only the southern portion is really well known, that is the part south of the Rio Ibicui and the Rio Jacuhy.

The principal mountain range has probably its origin in Matto Grosso, the most western province of the empire, and is crossed by the river Parana near the mouths of the rivers Piquiri and Aquatimi. Here it divides, the eastern branch joining the Serra do Mar on the boundary of the province Santa Catharina, and afterwards forming the Serra Parana piaca, while the southern branch near the mouths of the Uruguay pilu or Uruguay pinta is traversed by the main Urugnay, and then enters the province Rio Grande do Sul.

From a central peak near the town of Nossa Senhora da Soledad do Passo fundo, situated 9° west of Rio de Janeiro and about 28° south latitude, a chain runs west and is lost in the lowlands of the rivers Jacuhy and Uruguay; another easterly branch runs along the river Pelotas, joining the Serra do Mar; still another range, called Serra do Martinho or Coxilha Geral, stretches southwest through nearly two degrees, and after making a sudden rectangular turn for about half a degree, reassumes its former direction under the name of Serra do Batovi. Finally a fourth range, known as Butucarahy, runs in a southerly direction, nearly parallel to the Coxilha Geral, and ends in a single knob also called Butucarahy. This is the highest point of the entire province, being about 5000 feet above the Atlantic, and situated South latitude 30° 5′ and 9° 40′ west of Rio de Janeiro. At latitude 31°20′ south and 11°40′ west longitude, ends the Serra do Batovi. From here the Serra de São Roque branches off to the westward and loses itself in the lowlands surrounding lake Mirim. Towards the south stretches the Coxilha Grande, which, as before mentioned, extends to the sea in the vicinity of Montevidéo. Towards the west the Serra da Santa Anna, reaches to the banks of the Uruguay.

It follows from the configuration of the mountain chains, that only two main valleys can exist in this province. East we have the basin of the lakes dos Patos and Mirim, and west the valley of the Uruguay. The river Jacuhy, the largest and most important in the province, originates near Nossa Sñra da Soledad do Passo fundo, runs between the Coxilha Geral and the Serra de Butucarahy in a southerly direction, until it reaches almost the centre of the province, and then, after receiving from the southwest another considerable stream, the Vacacahy, it assumes an easterly course. Along this it receives from the north the rivers Butucarahy, Rio Pardo and Taquary, and from the south the Rio dos Ratos, and empties near the capital of the province, Porto Alegre, together with the rivers Cahy from the north, the dos Sinos from the northeast, and the swampy Gravatahy from the east, into lake dos Patos.

South of the Sierra de São Roque, and parallel with it runs another river, the Camacuam. It has its source in the Coxilha Grande, and flows also into Lake dos Patos. Farther south we encounter the Piratinim emptying into the junction of the two lakes, the so-called Rio Gonzalo. Along the southern boundary of the province, the river Jaguarão sends its waters into Lake Mirim. The western district is exclusively drained by the Uruguay, or rather the La Plata. The only tributaries to be mentioned are the Quaraim on the south, the Ibicui, or Santa Maria, and in the northern part, the Uruguay Pilu.

The eastern main valley is subdivided by the Serra de São Roque into two smaller valleys. These two and the Uruguay valley constitute also the three coal-basins of the province, and may be termed according to their situation:

1. Southern, or Piratinim basin.
2. Northern, or Jacuhy basin.
3. Western, or Uruguay basin.

These three basins belong to the same period, and the Piratinim basin is apparently the richest and most developed, covering an area of over fifty miles in length and about twenty miles in width.

In No. 61 of the Porto Alegre *Jornal do Commercio*, of March 16, 1870, I found a list of the places where coal had been found in the province. The author of the article seems to consider all those places as the outcrops of entirely different beds, since he speaks of anthracite (anthracito pyritoso), meagre and greasy coal, lignite and bituminous shales (schisto bituminoso). But, so far as I know, a thorough scientific investigation has never been made, and my own observations disagree entirely with the statements in the above article.

I have crossed the entire province from east to west, from the eastern coast to the valley of the Uruguay, and I must confess that I never before saw a country, the geological features of which were more regularly developed than those of the southern portion of Brazil.

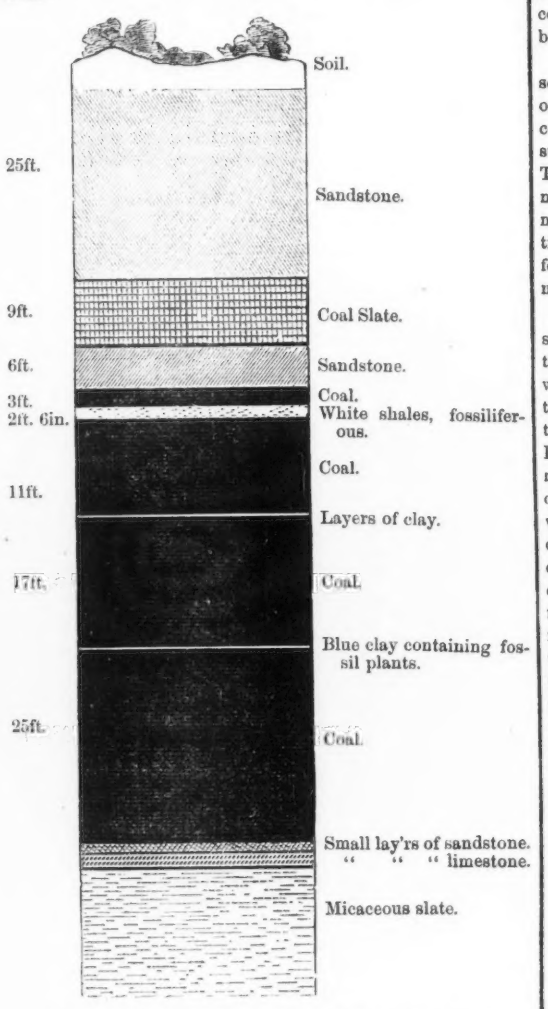
The mountain ranges are mostly made up of azoic rocks. Enormous masses of granite, mica slate, gneiss and syenite form rough, steep, and conical elevations which, in the southern portion of the province, are nearly destitute of vegetation, while the northern half is thickly and densely covered with virgin forest.

Only a few years ago the occurrence of the carboniferous strata in any part of the southern hemisphere had never been stated with any certainty; and we owe the discovery of the coal measures of Australia and South America to very recent investigations. The similarity as to the character of the coal, structure of the material, and the organic remains of former times, between the coal beds of Brazil and those of the United States is striking. Professor Agassiz wrote in relation to a number of specimens taken from the Piratinim coal beds, and

presented to him: "Had the whole collection been made in Pennsylvania, I would not more decidedly have recognized its carboniferous characteristics, down to the rocks underlying and overlying the fossiliferous beds."

1. SOUTHERN OR PIRATINIM BASIN.

The uppermost rock of this coal-field is a sandstone, which is highly ferruginous, variable in thickness (from 25 to 150 feet), and changing from a fine-grained sandstone to a pebbly conglomerate. It is underlain by a dark, grayish-blue bed of very bituminous slate. Underneath this layer is a bed, six feet thick, of a fine ochreous sandstone, with agglomerations of spathic iron ore. A bed of coal, three feet thick, which follows next, is very impure, and leaves, when burned, a large per centage of ashes. A layer of clay, about two feet six inches thick, contains innumerable fossil plants, mainly lepidodendron, sigillaria and stigmaria. The following two coal-beds are separated by a small seam of clay. The upper bed is eleven feet, the lower one seventeen feet thick. The coal is of a very fine quality, pure, with an occasional sheet of cannel coal in it, very inflammable, and swells up when burning. The beds are underlain by a seam of clay, varying from one foot to nine feet in thickness, and separating the lowest coal, a bed twenty-five feet thick, from the upper ones. This coal is the best, showing in all its parts a very homogeneous character. It has been tried on board of steamboats, and pronounced tc be equal to the best English coals; it leaves, however, more ashes, which may be accounted for by the fact that the samples were taken from very near the surface. It has also been tried as a gas coal, and Mr. W. G. GINTY, engineer of the Rio de Janeiro gas works, has a high opinion of it. The following are the results of his examinations of the Piratinim coal. The samples of Newcastle, Cardiff, and Wigan cannel, with which it is compared below, having been tried at the same time and in the same apparatus:



Section of the Southern or Piratinim Coal-Basin.

	Spec. grav.	Per cent. of coke.	Cubic feet of gas per ton	Illum. power in stan'ard candles.
Piratinim coal (mean of three qualities)	1.240	63.	6900	5.00.
Piratinim lowest bed	1.230	60.	8198	5.00.
Newcastle	1.250	62.	—	—
Cardiff	1.275	80.	—	—
Cannel coal	1.240	62.	9600	6.88.

The lowest members of the formation visible in the river beds are small layers of laminated sandstone, carrying an abundance of fossil plants, and a seam of limestone, which is underlain by micaceous slate. This limestone will become very important as a flux, whenever the iron deposits accompanying the coal come to be worked. These coal deposits have apparently never been much disturbed after the original deposition, since all the details are well developed and very regular. There are no signs of breakages or distortions. The general dip is only 5° to the southwest. The Piratinim basin is surrounded on the north by the Serra de São Roque, on the west and south by the Coxilha Grande, and on the east the coal-measures are overlain by the alluvial formation. The serras consist mainly of syenitic rocks, granite and gneiss.

The surface of the Piratinim coal basin is slightly undulating, and affords all the facilities for the exploration and working of the mines. There is no difficulty whatever in constructing a railway to a place whence the coal can be shipped, that is, to the Rio Gonzalo; for although Lake Mirim is the nearest sheet of water, it cannot be taken into consideration, as it has an average depth of only three feet This railroad would have a length of nearly twenty-five miles. The lands where mining operations should begin are heavily timbered.

The annual consumption of coal throughout the empire of Brazil, amounts to about 120,000 tons. Coal is sold in all the seaports for from 30 to 36 milreis ($15 to $18 gold), and the demand is constantly increasing.

2. THE NORTHERN OR JACUHY BASIN.

This basin embraces considerably more area than the one just described. Its longer axis stretches from east to west for at least ninety miles, while its breadth is about twenty miles. The boundaries are: on the south, the Serra de São Roque, west, the Serra de Batovi; north, the Serra de Butucarahy and a hilly country belonging to a newer formation; and finally east, the alluvial deposits. The river Jacuhy flows through its northern parts. North of it we find the most luxurious vegetation, forests whose tangled mazes can hardly be penetrated by the white man, and which still form the hiding-place of the fiend-like "bugres." The gigantic cedars, the iron wood, the lofty palms, the wild oranges, are all interwoven with tough creepers, and the sharp-thorned cactus grows everywhere. But on going south, we encounter very soon an entirely different picture. As soon as the strip of woods along the river bank is traversed we find ourselves upon open ground. As far as the eye can reach nothing is seen but the grass on a softly undulating surface. These are the campos of South America, the pasture-ground of innumerable herds of wild cattle and of horses, tended by the almost as wild campero. These campos, called "pampas" south and west of the Uruguay and Parana, extend from here to the Cordilleras and to the lands of Patagonia. The air on them is clear and healthy, the people are stout and merry, and present a strong contrast to the woodsmen, whose damp and feverish ground, combined with hard labor, make him an entirely different being.

On entering the harbor of Rio Grande do Sul, we find ourselves not very agreeably impressed by the entire barrenness of the country. Sand hillocks are shifted by every wind; covering up entirely the walls of the town and filling the streets to-day, and swept away out of sight to-morrow. These alluvial deposits are broken through by gneiss near the north end of lake Dos Patos, where it forms steep conical mountains covered with boulders and nearly bare of vegetation. In the valleys, where the decomposed minerals have formed a rich soil, the vegetation is rich and varied, and the most wanton growth is watered by numerous little creeks.

Going up the Rio Jacuhy, we have on both sides a low, swampy, frequently-inundated country, grown over with poor thorny plants, which are nearly suffocated by the elegant reeds, which often reach a height of from forty to fifty feet. Habitations are very scanty. At last we come to a little place called the "Xarquiades," lying on the right-hand bank of the river. Here we first find the upper sandstone of the coal measures more developed than in the southern basin, and reaching frequently a depth of 400 feet. It is a coarse-grained material, which becomes finer in depth. A little to the west of the Rio dos Ratos, we find the outcropping of three different layers of coal, respectively three feet, six feet, and eleven feet thick. The coal, with the exclusion of the upper bed, is said to be of a very fine quality. It has often been tried on the steamers which navigate the Rio Jacuhy. These beds may correspond with the three upper ones of the Piratinim basin. They are separated from each other by layers of clay. The hanging wall sometimes shows fossiliferous plants. The coal slates are frequently missing, and I found them in fact only in one place, but here developed to a thickness of some twenty feet. They are highly bituminous, and several water pools in the vicinity were covered over with petroleum. The overlying sandstone is not only very ferruginous, but it contains, also, deposits of iron ore, consisting principally of specular iron, with a very high percentage of metal. A gentleman who had formerly been connected with smelting works in Europe, told me that these ores had yielded, smelted on a forge fire, an average of 60 per cent. of iron. The main deposit of this ore, extending over several square leagues, is near the town of São Jeronimo, about six or eight miles above the mouth of the Rio dos Ratos, and nearly ten miles to the south of the Rio Jacuhy.

In this place all the conditions for the development of a valuable industry are to be found. Good coal, the very best iron ore, clay in abundance, and building material not far off, navigable streams, and a nearly level surface for the construction of railroads. The coal is generally underlain by micaceous slates. A carboniferous limestone is found in a few places, for instance, near the mouth of the Rio Pardo.

The age of a considerable stratum of beautiful white and fine-grained crystalline limestone, near the town of Encrusilhada, on the northern slope of the Serra de São Roque, which cuts off the carboniferous strata, has not been ascertained.

I found several outcrops of the coal beds along the margin of granite eruptions. In going from east to west, we find coal near the Rio dos Ratos; about thirty miles further west, near the little place of Capelinha; thirty-five miles further, near the town of São Sepé, and, singularly enough, the coal dips here towards the granite, at a place only about two miles from the eruptional line. The dip is very gentle, being only 3–4 degrees to the south-south-west, while the axis of the granitical elevation runs nearly from south to north.

The last coal croppings towards the west I found about half way between the towns of São Sepé and São Gabriel, some eighteen miles distant from each, below a magnificent cataract.

At all these places we find the coal beds lying between the same rocks, apparently formed under the same conditions, and of the same age. But we do not always find the three beds developed. At São Sepé, only one bed, five feet thick, can be found, lying between the sandstone and the micaceous slate. The outcropping between São Sepé and São Gabriel, on the Estancia de São Juan, shows two beds. The surface rock is the upper sandstone, varying from 40 to 150 feet; next follows a very thin layer of shales, three and a half feet of coal, two feet of dark blue shales, six feet of coal, clay, and micaceous slate.

The Uraguay basin I have not visited myself; I am, however, informed that the country is very rich, not only in coal, but also in other minerals, especially in gold and copper.

The granites surrounding the coal basins frequently change into gneiss and mica slate. The trachytic rocks, constituting a portion of the Coxilha Geral, and of its branch, the Serra de São Antonio, form rough and steep mountains, separated by deep gulches. They extend to the westward of the Rio Santa Maria.

The occurrence of gold in these rocks of volcanic origin has long been known, and has been a matter of great interest with the Brazilians, although they are entirely too indolent to trouble themselves with the working of mines. In the few exceptional cases, where persons are digging and washing gold in a small way, they are reported as doing a profitable business.

A New Method of Straightening High Chimneys.

IT is so frequently the case that the chimneys of our large mills and manufactories, owing to faults in the construction, or other causes, become inclined from the perpendicular, entailing great expense and trouble in efforts to remedy the evil, that any new device for accomplishing this object must prove a matter of interest. The following account condensed by a foreign paper from *Zeitschrift fur Bauwesen*, explains a method lately adopted with much success in Germany:

"It is a well-known fact that high chimneys, however carefully built, often lose their original straightness soon after their erection and assume an inclined position or a curved shape, so that it becomes necessary to straighten it. Recently, a very high chimney, erected in chemical establishments at Barmen, Prussia, was successfully straightened by a new method.

"This chimney is three hundred and thirty-one feet high. Its exterior shape is octagonal, with a clearance of eight feet throughout its whole length.

"This gives it an interior sectional area of thirty-three square feet. The socle is quadratic in section, twenty feet wide and forty feet high. The upper or pyramidal part of the chimney is octagonal, two hundred and ninety-one feet high. The exterior diameter of the latter is seventeen feet at the base of the pyramidal part. This diameter is reduced two and one-half inches on every ten feet upward. The masonry is seven bricks thick in the basement, five at the base of the pyramidal part, and two at the top.

"In the spring of 1868, remarkable for vehement and long-continued gales and storms, this chimney suddenly assumed an inclined position toward the northeast. The deflection of the chimney was considerable at the end of May, and seemed yet to increase, and threatened an overthrow.

"Some layers of bricks in the chimney at distances of fifty feet from each other were painted black outside. The height of these black lines above the socle being known, these lines were, by means of a theodolite, projected on a plank situated on the socle of the chimney, to find the deviation from the vertical line at these different heights. It was thus ascertained that the chimney at a height of

51 feet was out of line	.....	45 inches.
210 feet " "	.....	30 "
160 feet " "	.....	16 "
110 feet " "	.....	5 "

"The socle stood perpendicular. As the deviation was still increasing, and as it would have done too serious an injury to the manufacture of the establishment to set the chimney temporarily out of use, it was necessary that immediate action should be taken in the matter. The ordinary method of straightening chimneys was resorted to. A hole was made through the whole thickness of the masonry on that side of the chimney which required lowering four feet above the top of the socle. Into this hole a saw was introduced with which a horizontal cut through one-half the chimney was attempted. But as the thickness of the wall was considerable and the bricks hard, and as the saw could be manipulated from one of its extremities only, the effect of sawing, after two hour's work, was scarcely perceptible.

"The hole through the chimney having been made without trouble, and the difficulty experienced in sawing led to the idea to gradually remove a whole layer of bricks, replacing it by a thinner layer thus to produce the desired slit. Before, however, this operation was performed, the experiment was made with an old inclined chimney one hundred and twenty feet high. When the method had there proved practicable and successful, it was concluded to treat the new chimney the same way.

"A layer of bricks was broken out by means of pointed cast-steel bars, from one and one-half to five feet in length, and flat shovels, with long handles, were used to lay those bricks which had to be placed near the inside of the chimney. A space of five inches was left each time between the newly laid bricks and the old ones of the next division, to break out the latter with greater facility.

"As soon as the operation was performed, the chimney began to move, and by slight oscillations slowly settled down on the new layer of bricks, and there remained quiet."—*American Builder.*

HON. S. S. FISHER, COMMISSIONER OF PATENTS, has left Washington on an extended visit to the West. During his absence the duties of the Commissioner will be discharged by General S. A. DUNCAN, assistant Commissioner of Patents, an office recently made by Congress. Mr. DUNCAN is no doubt well qualified for the position he assumes, as he has had a long experience with its duties.

MINING SUMMARY.

California and Nevada.

LEAD AND SILVER SMELTING IN SAN FRANCISCO.

IN an article quoted recently from the White Pine *News* on the enlargement of the Newark (N. J.) Reduction Works, it was alleged that this was rendered necessary by the increase of shipments of base metal ores, the smelting facilities in San Francisco being so limited in capacity and slow in doing the work and making returns, that miners of Utah and Nevada are obliged to send their ore to the Atlantic States for treatment. So far, however, from this being the case, says the San Francisco *Bulletin*, we have in San Francisco the most extensive smelting works in the United States, which have been quietly growing up during the last four years, in a remote part of the city, and almost unknown beyond the large number of workmen immediately engaged, and the mining and freighting interests which are employed in furnishing ores and crude bullion. We refer to the lead and silver smelting works of Mayor SELBY, near Black Point—an establishment of the first importance as a means of developing the mines of the Pacific coast, and with reference to the value of its transactions. These works, which we have recently visited, consume the great majority of all the ore and crude bullion shipped to San Francisco, and they are being constantly increased in extent to keep pace with the expansion of the industrial interests with which they are associated. Their present capacity can be enlarged to an unlimited extent; but even now the quantity of crude bullion and ore consumed exceeds that of any other lead and silver smelting works in the country—probably working up twice the amount used by the Newark Reduction Works, which, at one time, were considered the largest in the United States.

The legitimate place for smelting the ore would seem to be at the mines from which they are extracted; but as they can be more advantageously worked where science, skilled labor, and capital are concentrated, as at the seaboard cities, the nearest and most available locality is undoubtedly San Francisco. From the mines of Nevada and Utah to this city, the distance is so small, compared with that to the Atlantic States, as to constitute the former the natural customer for their ores, rendering successful competition from the East out of the question. And we propose to show that in our city the facilities for smelting are superior to what are offered in any other locality. The small shipments of ores, which upon the opening of the Pacific Railroad went East as experiments, soon established these facts, as well as that higher rates are paid at the smelting works here than can be obtained elsewhere in the United States, while the cost of transportation is at least a half less in favor of San Francisco, to say nothing of the considerable percentage of ore that is lost by car shifting and the jolting and sifting incident to so long a transit.

Some of the shippers who for a while gave Newark a trial soon became satisfied of this, and are now again sending their ores to San Francisco, not only because the work is done cheaper here and the charges are less, but the treatment is more thorough and consequently the yield greater. This same rule as to cheapness applies to ores that have been shipped to Swansea for reduction, and there is this additional fact in connection with that market, that while miners complain of not receiving fair returns from Swansea, experience has shown them that at Mr. SELBY'S works they are honorably and promptly paid.

As regards the time consumed in the treatment of ores, miners will find that the advantages, on account of the late improvements will be largely in favor of San Francisco, and that returns will be made with very little delay. The rule adopted by Mr. SELBY is to buy the ores, which is conveniently done, owing to the extent of his connections and agencies throughout the mining region. The works are always ready to pay shipping expenses on ore from anywhere, and meet freight bills promptly on all kinds, the bills of all kinds following the metal.

Although a large and increasing amount of ore is received at the Works from Nevada and Utah, they are by no means dependent on those States for their supply, which arrives from about every important lead and silver locality on the Pacific coast, including the distant mining regions of New Mexico, Arizona, Mexico, and along the Colorado River, whence they are brought by sea via the Gulf of California. No crude bullion nor ores are refused, unless the latter are of too low a grade to admit of profitable reduction. In the early history of the enterprise, ores for a while came too fast for the extent of the works; but with the present enlarged facilities it would be difficult to overtask their capacity, which can at short notice be increased so as to meet any demand likely to be made on them in the future. They were originally designed by Mr. SELBY, in joint interest with his New York partner, Mr. P. NAYLOR (now on his first visit to California during a business association of twenty years), for the purpose of supplying their shot-tower in this city with lead. The idea of manufacturing for Eastern markets, or for exportation, had not then been entertained. For years the experiment was a failure, financially, and a less persistent man than Mr. SELBY would have abandoned the enterprise. Costly experiments were necessary, and heavy expenditures attended the enterprise before returns began to be realized. The result is the most important lead and silver smelting establishment in the country, employing, directly and indirectly, more than a thousand men in the various callings with which it is associated. It is the friend of the workingman, for whom it acts as a reliable bank of deposit, and whose labor it converts into ready cash on demand.

The location of the works, which occupy four fifty-vara lots, is on Jefferson street, at the northern extremity of the city, on a point of land projecting into the bay opposite Fort Alcatraz, and at the northern terminus of Montgomery avenue, that is to be. On the bay there is ample wharf frontage, with depth of water sufficient to accommodate the vessels engaged in ores and crude bullion to the works, and carrying away lead and silver. This bulkhead wharf is being steadily pushed out into the bay by the accumulations of slag and other matter, real estate being thus increased at a rapid rate. A railroad for hand-cars extends through the works to the water front, serving the double purpose of conveying market, lead to the vessels at the wharf and for dumping the refuse collections at the bulkhead. The works, which are indicated from a considerable distance by a large stack, are approached by a plank road laid through the sand drifts which here reach nearly to the shores of the bay. Formidable notices of "No Admission," posted over the gateway, remind one that the inmates are supposed to know how to keep their own counsel.

The entire works are under the general supervision of PRENTICE SELBY, a son of the proprietor, who, from the beginning, has aided in bringing them to their present state of efficiency, and who has recently returned from a short visit to examine the smelting facilities in the Atlantic States—a tour of inspection, which, it may be added, showed that the business as conducted in San Francisco is far in advance of any Eastern competition. The immediate Superintendent, W. R. THOMPSON, who entered upon his duties when the works were yet in an experimental condition, explained to us in detail the various processes. We do not propose to risk confidence by an attempt at description. Suffice it to generalize by stating that the ore, landed at the wharf, is brought by railroad into the works, where it is crushed, sampled and prepared for calcining; thence it goes to the blast furnace to be smelted; thence to the refining furnaces, where it is cleared of its base matter; thence to the desilvering furnaces, which separate the silver from the leaf. Here it "splits" and takes two directions—the lead going to the refining furnace again, where it is converted into market lead, is stamped with the proprietor's name, and is piled away ready for shipment. The residue from the desilvering furnace goes back to the smelting and thence to the cupel furnace, where the small percentage of lead still remaining is extracted, leaving the silver pure, or nearly so. This is melted again in crucibles to still further refine it; for although it comes from the cupel furnace 990-1000 fine, which is suitable for the purposes of the Mint, it is not fine enough for shipment to China, where the standard required is 996-1000. The perfection to which this art may be brought is shown in one lot of 10,000 ounces, which assayed nine hundred and ninety-nine and three-tenths one thousandths fine.

Upon entering the works, the visitor is impressed with their extent and the amount of business transacted. A powerful engine carries the blast to the furnaces and drives the crushing mill; and far and near, through the smoke, the heat of intense fires, the clash of iron implements, the glare of furnaces, and the clank of machinery, indicate a hive of industry, where science and labor are intelligently combined to unlock the treasures of the mine to the purposes of trade and commerce. Everywhere the attention is called to interesting and instructive processes. In one furnace we are shown about 6,000 ounces of melted silver. From others liquid lead is being ladled into moulds placed in rows ready to receive it. Beyond, a stream of red-hot litharge is being run from a cupelling furnace. In another direction pyramids of pigs of crude bullion are being carefully sampled, by clipping off with chisels pieces from the corners and edges. Further on a gang of men are piling up 1,200 pigs of market lead, weighing 115 pounds each, the result of one week's work. In a huge iron safe are stored quantities of silver in sheets and heavy fragments, ready for transportation to the United States Mint. Near one of the desilvering furnaces is piled a mass of silver "dross" (the residue which has been separated from the lead, and carrying from 1,200 to 1,500 ounces of silver to the top), awaiting the process of the cupel furnace. The lead, after each melting, is run into pig-moulds, and is conveyed to the successive furnaces by a system of miniature railroads, branching off in all directions to distant parts of the works.

Following our conductor, we enter the assaying department, where exist all the most approved modern appliances for dispatch and accuracy. This department is a scene of scientific industry, in which many interesting experiments are made in furtherance of the object of the works.

Situated over the main works, and reached by an inclined road, is an extensive platform on which are collected and arranged the various substances which are fed down as fluxes into the smelting furnaces below, in quantities as required—such as scraps and cuttings of iron and other metals, lime, and a general mixture of the by-products of the works—dross, agglomerated ore, etc., which are worked over and made to serve a profitable purpose.

The remarkable success now attending the works was only reached through years of heavy outlay and careful study. The idea that smelting is a simple affair, requiring only the throwing in of the ore and the running out of the metal, is effectually dispelled after an examination of the intricate process—the skill and experience required in the business. To an uninitiated spectator there is a strange fascination in these rills of liquid silver pouring from flaming furnaces—these pools of molten lead confined within margins of white-hot masonry and reflecting like mirrors the delicate and ever-changing colors produced by the mysterious action of heat and chemicals. In these smelting works fourteen furnaces are kept constantly employed, and that number will be doubled as the supply of ore increases.

The most valuable ores are received from Arizona, and localities too remote from any Eastern market to admit of shipment there, even were it desirable. The works take without hesitation all available ores that are offered. One firm in the neighborhood of Salt Lake have received $40,000 for ores shipped by the Pacific Railroad. Another located in the southern part of this State has been paid upwards of $100,000 for lead bullion. So extensive has the business become under the intelligent management of Mr. SELBY, that his works have stopped the importation of lead to the Pacific coast as effectually as his shot-tower has driven all other shot out of the market; although in both enterprises he commenced against heavy Eastern competition and with the general prediction that the attempt would prove a failure.

Not only have the works grown into the largest producer of lead in the United States, (of which the shipment to Mr. NAYLOR in New York, will this year be 1,200 or 1,500 tons, constituting a valuable item in our home industry,) but they are yielding silver bullion at the rate of $30,000 per month, which is extracted from the lead, all resulting from the enterprise of one firm, and redounding largely to the credit of California. The growth of this branch has been such that furnaces especially for smelting gold and silver ores are about to be erected. These will also work up the jewelers' and mint sweepings, which, in the long run, is a substantial item; and there is no reason why the smelting of copper and tin ore should not be successfully carried on at the same establishment, which, if its transactions continue to increase as rapidly as they have done for the few years past, seems likely to rank with the well-known ones of England, Wales and Germany.

While the yield of all other branches of mining on the Pacific coast has declined, that of lead mining has steadily increased, under the encouragement created by the persistent energy of one firm. Of the 30,000 tons of lead now annually used in the United States, less than 20,000 tons are produced in our own country. Statistics show that the home product has been lessening since 1862, while the annual consumption, and consequently the importation from foreign countries, is largely increasing. Thus, there is no danger of overstocking the market. The above amount, annually consumed in our country, is used in a multitude of ways; for lead pipe, lining of tubs, vats, etc.; soldering, preparing chemicals and dyes; bullets, type metal; weights, plumbing for houses, steamships, etc.; pipe and sheet lead and shot, of which 12,000,000 pounds—and paints, including white lead, of which no less than 40,000,000 pounds—are annually manufactured and used in the United States.

This conclusively shows the demand for lead must always be immense, and they should stimulate miners to make larger shipments of Galena ores to San Francisco, to meet the additional facilities which these works are preparing for them. Instead of there being insufficient smelting accommodations for the ores, as has been represented, the works are not supplied to their full capacity. Now that the Pacific Railroad has opened direct and cheap communication with the silver regions of the interior, mining communities who lack the capital to build their own reduction works, can realize the assay value of their ores with the assurance of perfect accuracy and uniform regularity.

THE COMSTOCK MINES.

The San Francisco *Bulletin* has the following intelligence: "At a meeting of the Overman Mining Company, held yesterday afternoon, the capital was changed from $1,600,000, divided into 3,200 shares of $500 each to $1,280,000, divided into 12,800 shares, of $100 each.

The June receipts from the Overman Mine amounted to $18,700, and from the Sierra Nevada mine, $16,300.

The annual meeting of the Chollar-Potosi Mining Company was held on the 11th inst. This is one of the two claims on the Comstock Lode now paying dividends. The President's report places the profit of the mine for the year at $420,000. The cost of extraction has been reduced 30½c.; the cost of reduction 34c., while the average yield of the ore worked has been increased $1 18 per ton. Of high grade ore, there is known to exist about 50,000 tons, while the quantity of $13 @$20 ore is incalculable. A patent for the company's property has been issued, but declined, because saddled with a royalty to the Sutro Tunnel Company. The Superintendent reports the extraction of 56,000 tons of ore during the year from the following sections:

	Tons
Blue Wing	26,044
Tunnel	12,000
Grass Valley	6,212
Belvidere	8,000
Croppings	4,380
Total	56,636

The amount milled was 59,355 tons, averaging $24 86; cost of milling, $12 81; cost of labor and materials, $3 99; cost of extracting, including building and repairs at new shaft, $5 37 per ton. In conclusion, the Superintendent remarks: "The future looks propitious, as circumstances give promise that this year will prove as profitable as the past has been." A number of interesting tables follow. We condense from one the following, showing the number of tons of ore worked and bullion yield for each month of the fiscal year ending May 31, 1870:

1870-70.	Tons Worked.	Bullion.
June	6,807	$175,671
July	6,412	163,650
August	6,593	149,398
September	5,517	116,667
October	5,266	108,970
November	3,578	87,580
December	3,201	76,184
January	4,495	118,263
February	4,058	91,545
March	4,549	113,189
April	4,313	130,361
May	4,545	146,983
Totals	59,354	$1,475,461

From the report of the Secretary we condense the following, showing the financial condition of the company:

RECEIPTS.

From bullion and premium	$1,479,128 59
Sales of crude ore	3,530 79
Insurance on property destroyed by fire	37,000 00
Miscellaneous	2,616 91
Balance, as per last statement	168,991 35
Total	$1,691,267 64

DISBURSEMENTS.

Dividends to stockholders	$420,443 00
Labor at Virginia and San Francisco	234,605 35
Materials	8,211 82
Hardware	6,983 66
Candles	5,842 00
Firewood	9,230 71
Assaying	3,166 93
Water	2,356 75
State and Federal taxes	6,661 74
Timber and Lumber	55,308 35
Working ores	760,174 00
New shafts	16,191 98
Legal expenses	4,369 97
Freight	7,249 40
General expenses	7,642 82
Miscellaneous	14,576 21
Cash on hand June 1, 1870	128,252 95
Total	$1,691,767 64

At the election held to-day, the following named Trustees were chosen: A. K. P. HARMON, President; E. D. FRY, Vice-President; A. HAYWARD, WILLIAM MORRIS, ROBERT SHERWOOD, JAMES FREEBORN and H. C. GIBBE. W. E. DEAN was re-elected Secretary and ISAAC L. REQUA, Superintendent.

Idaho.

BULLION PRODUCT OF OWYHEE.

According to the the *Avalanche* the *bona fide* bullion product of Owyhee for month ending July 8th, as shown by Wells, Fargo & Co.'s treasure shipments, was $100,000.

FLINT BULLION.

For its present population, only about 25, Flint District, nine miles from Silver City, is turning out more treasure than any other camp in the Territory. Says the *Avalanche*, July 9: "Within the last three days 475 pounds of bullion have been brought over from there. Some of the rock crushed yielded as high as $200 per ton. Black's mill is now running on ore, we believe, from an extension of the Leviathan."

LOON CREEK.

A correspondent, writing from Oro Grande, under date of July 2d, says that times have been very dull on account of high water, but that the camp is now putting on a more lively appearance. The water in the Creek is falling rapidly, flumes are being constructed, and the ones that are already completed are taking all the water. Mining would commence in earnest on the 4th of July. Claim owners intend to employ all the men they can possibly work to advantage, and good times are expected from now until snow falls. Building and repairing are going on lively.

Michigan.

THE COPPER MINES.

The Ontonagon *Miner*, July 16, says: "As we go to press we learn that a fire has broken out under ground in the Minnesota Mine. The fire was discovered at No. 6 shaft. Captain JAMES and three other men went down to discover its whereabouts. Th nnd that

was principally on the one-hundred fathoms level. Every exertion is being made to extinguish the fire. Intelligence reaches us that the Franklin and Pewabic Mines (in Houghton District) have stopped all work on company account. This seems rather queer, certainly on the part of the Franklin, when we consider the fact that it is supposed to have cleared $8,000 last month. The agent has taken the mine on tribute. The South Pewabic is trying to get up another Huron case, according to the P. L. *Gazette*. It is said that $20,000 is due the men. Considerable trouble is being had relative to this indebtedness. The company throw all blame for their difficulties on Captain FRUE, the agent. Besides the mine indebtedness for labor, there is a large bonded debt. The Hecla proposes to pay its stockholders some twelve dollars a share, between now and August 1st. The Hancock mine resumed operations last Friday. Orders have been given to expend not more than seven thousand dollars per month. In Ontonagon county there is no special mining intelligence to give. Those mines which have been at work all the time, still continue. Nothing of importance reaches us from Victoria. Considerable copper is sent forward for shipment from the National and Ridge. Quite a sizeable mass was thrown down lately in the former.

ON DIT ABOUT MINES AND METALS.

The Mineral Industry of the Argentine Republic.—Major RICKARD, Government Inspector-General of Mines of the Argentine Republic, has just issued a valuable work on the mining industry of that State. There is no one entitled to speak with more authority on the subject, and he treats it with a fullness of detail which cannot but be welcome to those who are interested in developing the resources of the remarkable country he describes. At the close of the book he gives a summary, showing, province by province, the mines and other works in operation, the numbers employed, the capital invested, and produce, and the following are the general totals of the summary:

MINES, &C., IN THE ARGENTINE REPUBLIC IN 1868.

Number in Operation—	Mines.	Reduction Works.	Placer Washings.	Total
Gold	28	13	28	69
Silver	44	15	—	61
Copper	11	6	—	17
Total	85	34	28	147
Number of persons occupied	1,086	1,506	95	2,687
Capital invested	£97,906	199,359	703	297,968
Produce—Gold ozs.	600	1,788	1,266	3,654
Silver "	195,034	223,167	—	418 201
Copper cwts.	—	15,032	—	15,032
Value of Produce	£40,299	92,045	4,647	135,991

Proportion of the produce in relation to the capital invested, 45.60 per cent.

No one can read the book, however, without becoming confident that under good government the mining industry of the Argentine territory must enormously increase. The author claims for it a capacity similar, if not superior, to the Far West of the United States, and he states, at any rate, sufficient facts to justify the attention of capitalists. The book, we may add, contains many particulars, which will be generally useful for intending emigrants, whether artisans, laborers, or farmers.—*Economist.*

A new metallic paint is thus described in the *British Trade Journal*: "It is very cheap, not only in its first cost, but the economy of its use, one coating being equal to two of any other paint, according to the inventor. The chief merit of the invention is in the utilization of the common resin of commerce in combination with oxide of zinc. The resin is first broken up into dust or small pieces and then dissolved in benzoline or turpentine until the solution acquires the consistency of syrup or treacle; or equal parts of each of the above spirits or hydrocarbons that will dry and combine with drying oils can be used instead of turpentine or benzoline. When the solution is complete, it is gradually added to the oxide of zinc, which has previously been made into a paste, with boiled linseed oil, until the whole mixture acquires the consistency of paint suitable for use. A white paint is thus produced of a most durable and glossy character, capable of resisting heat, moisture, cold and friction better than any other known paint. Other pigments, such as sulphate of barytes, oxide of iron, Brunswick green, red lead, or any other known ingredient, can be added to make any desired color of paint. One great advantage of its use is its effectual resistance to heat and moisture. It never blisters or cracks, even under the hottest sun or the most inclement weather."

The Great Pitch Lake of Trinidad has lately been visited by the Rev. CHARLES KINGSLAND, the novelist. Trinidad lies off the northeast coast of Venezuela, at the mouth of the gulf of Paria. The Pitch Lake is situated on a small peninsula, and is about eighty feet above the level of the sea. Mr. KINGSLEY says that the lake covers an area of ninety-nine acres, and contains several millions of tons of asphaltum. The geological surveyors of Trinidad state the lake is due to dead vegetable matter, which, in a temperate climate, would have been changed into peat, and finally into brown coal, but under the hot tropical soil becomes asphalt and oil, which is continually oozing up beneath the pressure of the strata. The whole lake is covered with logs of wood and sticks standing upright, and the pitch itself contains twenty or thirty per cent. of earthy matter, so that it can be kneaded for a long time without sticking to the fingers, and nothing adheres to the hand but a grayish mud and water."

Black Band Iron Ore.—A correspondent of the Chicago *Bureau* says that Massilon, Ohio, is the only location in the world, with the exception of certain places in Scotland, where the ore known as "black band" has, as yet, been discovered. The same ore has been discovered in Eastern Pennsylvania, but not in paying quantities. He credits Massilon with furnishing a quality of pig iron equal to Scotch pig. The furnaces and coal mines at Massilon have been idle for three months on account of a strike among the miners.

Vermont Copper Works.—The copper works at Vershire, Vermont, are now employing from 250 to 300 workmen, yield about 125 tons of ore per week, and claim to be the only copper mines in the country which pay expenses. About eight tons of iron are lost every day in the process of separating and manufacturing the pure copper, but it is expected this waste will soon be obviated.

Missouri Lead Mines.—The lead mines in the vicinity of Locust Mound, Mo., are just now receiving great attention. Many leads are yielding from three to four thousand pounds a day to the hand, and the young men of the country are giving up farming for mining. Two lead furnaces in the vicinity are in full blast.

Colorado Bullion.—The last shipment of silver bullion by the Brown Company to the East amounted to—coin value—$7,862 40. We are informed that the mine has improved much, and that the increase in the amount and quality of the ore raised will enable the company to make larger shipments of bullion than ever before.

SPECIAL SCIENTIFIC BREVITIES.

Interesting Scientific Experiment.—A recent scientific work records the result of a very interesting experiment, which demonstrates, beyond question, that the woody fibre of trees is derived almost entirely from the air. Two hundred pounds weight of earth were dried in an oven, and afterwards put in an earthen vessel. The earth was then moistened with rain water, and a willow tree, weighing five pounds, was planted therein. During the space of five years, the earth was carefully watered with pure water; and to prevent the addition of fresh earth, or dust blown to it by the winds, it was covered with a metal plate perforated with a great number of small holes, for the admission of air only. After five years the tree was removed, and found to weigh 169 pounds and about three ounces, the leaves which fell every autumn not being included in this weight, The earth, on being removed and again dried, was afterwards discovered to have lost only about two ounces of its original weight; thus 169 pounds of woody fibre, brake, or roots, were produced, and the air proved to be the source of the solid element at least. The atmosphere contains a notable amount of carbonic acid, which is a compound of oxygen and carbon—the latter forming nearly the entire weight of wood after the extraction therefrom of the water or sap. But, while this experiment may be conclusive as to the composition of woody fibre, it may be considered equally certain that fruits and grains, which contain a large percentage of various salts not found either in the atmosphere or in rain water, derive these elements from the earth. Indeed, every agriculturist knows by experience that the soil gradually loses its nourishing qualities, unless the substances extracted are restored in the form of fertilizers.

Structure of Steel and Iron.—M. SCHOTT, of Ilsenburg, has made many microscopical examinations of the structure of steel and iron. He maintains that all crystals of iron are of the form of a double pyramid, the axis of which is variable, as compared with the size of the base. The crystals of the coarser kinds as compared with those of the finest qualities of crystalline iron, are of about twice the height. The more uniform the grain the smaller the crystals; and the flatter the pyramids which form each single element, the better is the quality, the greater is the cohesive force, and the finer the surface of the iron. These pyramids become flatter as the proportion of carbon contained in the steel decreases. Consequently, in cast iron, and in the crudest kinds of hard steel, the crystals approach more the cubical form from which the octahedron proper is derived; and the opposite extreme, or wrought iron, has its pyramids flattened down to parallel surfaces or leaves, which in their arrangement produces what is called the fibre of the iron. The highest quality of steel has all its crystals in parallel positions, each crystal filling the interstices formed by the angular sides of its neighbors. The crystals stand with their axis in the direction of the pressure or percussive force exerted upon them in working; consequently, the fracture shows the sides or parallel crystals. In reality, good steel shows, when examined under the microscope, large groups of fine crystals like the points of needles—all arranged in the same direction or parallel.

Reproduction of the Oxide of Iron Employed in Gas Purifiers by Means of Steam.—C. MENE, in a paper on the above topic, which is noticed in the *Chemical News*, describes a new mode of operation, which is at once simple, and, to all appearances, complete. It may prove to be of inestimable practical importance. The process described is in use in the Lyons Gas Works, and is as follows: The iron to be revivified is taken from the purifiers, loaded with its sulphur, and placed in a tightly closing iron reservoir, into which steam is admitted by a pipe emerging in its lower portion. Coming into contact with the sulphide, the steam is decomposed, its hydrogen goes to the sulphur, and its oxygen regenerates the iron. Sulphuretted hydrogen, the gaseous product of the action, is carried off by an escape pipe leading to the chimney of the furnace. The mode at present employed, whenever the oxide of iron is used as the purifier, is to expose it over considerable space to the gradual action of the air. The new method, in its convenience and time-saving, bids fair to come into universal favor.

Purification of Water.—On the lower Maas, in Germany, the only water obtainable is that of the river, which affects persons unaccustomed to drink it, very injuriously. Yet, strangely enough, the most searching analytical and microscopical examination failed to detect in what consist the deleterious elements. On the supposition that the unhealthiness of the water proceeded from the solid matter suspended in it, and which did not even disappear after long standing, Dr. GUNNING succeeded in entirely disinfecting the water by means of chloride of iron. For every two pints of water there are taken 0.032 grammes of the dry chloride of iron, dissolved in distilled water; the whole is well stirred and suffered to stand thirty-six hours, at the end of which time a flocculent precipitate will have formed. To insure the neutralization of any hydrochloric acid that may be formed, 0.085 grammes of crystallized soda to two pints of water may be added. This method of purification has been thoroughly tested, and is easy of application to any well water containing organic matter.

Protective Action of Copper in Cholera Epidemics.—The remarkable fact has been elicited by the investigations of Dr. CLAXTON, upon the effects of copper on the human system, as stated by him at a meeting of the Clinical Society, London, that men engaged at the various copper works in that city, always escaped cholera and choleraic diarrhœa during great epidemics. Dr. CLAXTON'S statements have lately been confirmed by M. BURG, in some statistics communicated to the French Academy of Sciences. M. BURG states that during the epidemic of 1865-6 in France, only one out of 1,270 workers in copper was attacked, the total number of persons thus engaged being 37,000. With workers in iron and steel, on the other hand, one out of every 200 was attacked; and of those engaged on other metals than copper or iron, one out of 178.

Sulphuric Acid.—According to H. REINSCH, a hundred weight of gypsum CaO, SO_3 2HO contains 57 lbs. of sulphuric acid. It is well known that many attempts have been made to manufacture acid from this abundant mineral, but hitherto with little or no success. Mr. REINSCH states that when he mixed 2 parts of pulverized gypsum with 1 part of carbonate of ammonia, and poured water over this mixture, complete decomposition of the gypsum ensues, sulphate of ammonia is formed, and carbonate of lime. The sulphate of ammonia is, in its turn, decomposed by means of common salt, the result being the formation of sulphate of soda and chloride of ammonium, which can again be converted into carbonate of ammonia by means of chalk.

Steel Rails.—The Chicago and Alton Railway will lay during the present year 20,000 tons (20 miles) of solid steel rails, principally between Chicago and Wilmington.

MISCELLANEA.

A Novel Vessel.—The model of a sea-going vessel of very original build is now to be seen in the port of Algiers. A general idea of the construction is obtained if we imagine a steamer cut in two, and the severed parts made the supports of a bridge four times the length of the original vessel. This bridge has an air-chamber in its entire length, so that if by accident it should become parted from the supports it cannot be submerged. It is destined for the cargo, but cabins in the form of boats are so arranged along the sides of the bridge that in case of accident to this latter, they may be navigated separately. Thus there are three chances of safety if the construction goes to pieces. The supposed advantages are, first, great speed (since the larger part of the vessel, not being in contact with the water, the resistance is so much diminished), safety, and great space for cago. Something of this kind has been projected for taking railway trains across the Channel, but we do not remember to have seen it suggested for vessels going a long distance.

Smoke-Consuming Grate.—The *Colliery Guardian* (English) gives an account of some experiments made by a Mr. ERSKINE with a patent grate-bar, by which much of the smoke given off by the soft bituminous coal is consumed. According to the statements made, the smoke nuisance was entirely abated. The *Guardian* says: "The sides are cast in a zigzag shape, and a kind of bridge is formed at the end of the furnace. Most of the smoke is consumed as produced by the hot air admitted into the body of the furnace; and any portion which may have escaped combustion during its passage is met at the furthest end by an additional and distinct ingress of hot air, which at once consumes it, so that scarcely a trace of visible smoke is perceived at the outlet of the chimney."

To recover treasure sunk beneath the waves of the sea, one hundred and sixty-eight years ago, seems a rather foolish undertaking in this practical age; yet a company has been organized in France for the express purpose of bringing back to the upper world the specie that went down with the Spanish galleons in the port of Vigo in October, 1702. Upwards of eighteen hundred millions of reals is said to have been on board these ships—an amount certainly well worth fishing for. It is proposed to raise the old wrecks by means of sheet-iron cylinders and chains. The former articles are to be converted into powerful lifting machines by means of gas. The experiment will be watched with great interest by all who take an interest in ingenious and novel mechanical contrivances.

Hot.—Do not think it hot here at the East, when we get reports from California of 114° in the shade, and peaches and grapes and apples roasted on the trees. The San Francisco *Scientific Press* states this as a fact, and says that it was 120° in the shade at Marysville in 1858. We wish our friends would put their thermometers in the sun as well as in the shade. That would give us some idea of the highest degree of heat to which we are exposed. A week since we saw the thermometer go up to 146° in the sun in a well-sodded yard at Newark, and that too before the stones, bricks and houses were heated so as to radiate much heat. Let any one beat that if he can.

Malt Sweepings.—The London *Food Journal* reports that a country brewer finding that the malt sweepings from his brewery were rapidly increasing in value, inquired of the purchasers to what purpose they were applied. Being told that the malt sweepings were extensively used for feeding pigs, he resolved to put this information to the test, but discovered that his own pigs became daily more and more emaciated from this diet. Upon further examination it was ascertained that the real use of the refuse malt was to adulterate chicory, afterwards sold as coffee! The question has therefore been asked whether malt sweepings would not cause men as well as pigs to become lean?

The Vermont Gold Mines.—The reported discovery of gold in paying quantities in Vermont, some time ago, created considerable excitement hereabouts. The ardor of those who have been most conspicuous in testing the true value of the discoveries has, however, now abated. We learn that the New York Mining Company, with A. L. Allen, of Poughkeepsie, N. Y., as agent, have, after sinking a shaft down into a solid rock at Bridgewater, one hundred and seventy-five feet and twelve feet in width, abandoned work and all hope of making it pay.

The Value of Good Roads.—The resistance to draft on dirt or gravel roads is about 148 lbs. to the ton. On a well-constructed macadamized road it is not far from 66 lbs. to the ton. On a good pavement, say granite or Belgian, it is about 33 lbs. to the ton, while on an iron rail track it is only 8 lbs. to the ton. These facts show that a horse will draw about three times as much on a macadamized road as on a common road, four and one-half times as much on a pavement, and eighteen times as much on an iron rail. This conclusion, of course, implies that the horse has the same secure foothold in each given case.

Iron Steamers on Western Waters.—Cincinnati is building an iron steamer for navigating the Red River. She is to be 180 feet long by 42 feet beam, 6 feet draught of water. Costs $65,000—twice as much as a wooden vessel, and lasts six times as long, with no expenses for docking. She will be the third boat of the kind ever built on Western rivers. Two others were built of iron some twenty-five years ago. Westerners think this the dawn of a new era in boat-building on Western rivers.

The Gold Coin Standard Values—International Assimilation.—A writer from Paris says: "The French monetary commission, which was appointed some time since and charged to define the currency values, has decided that gold is the only legal standard tender. It recommends that the new gold coin, twenty-five francs piece, of France, be assimilated in value to the British gold sovereign and to the American gold half-eagle.

Iowa Silver.—The silver excitement has again broken out in Cedar county, Iowa. It is said that a company has been formed for the purpose of fully developing whatever may be there, and many of the farmers in that region of country are taking stock in the enterprise.

Water-Power of Maine.—The State of Maine has just completed the survey of its water-power. Mr. WALTER WELLS, the secretary of the commission, reports the total available amount of water-power in the State is 1,000,000 horse-power. The report presents the fullest details relative to the subject.

Women Telegraphers.—In Russia the telegraph is now chiefly worked by women, and they have proved so efficient that the Minister of the Interior has laid before the Imperial Council a scheme for their further employment in the public service.

Solar Rock Salt is manufactured at Augusta, Maine. Ten hands are employed and 500 boxes of salt are daily manufactured. The salt is dried on wood instead of iron.

The Sutro Tunnel is in 1,300 feet. The formation clay and porphery. There is some water.

MARKET REVIEW.

The Coal Trade.

NEW YORK, July 29, 1870.

WHOLESALE.—The trade remains in a very unsettled state. Nothing definite can be stated regarding the several strikes, and other interferences which have occurred to demoralize the coal trade during the past two or three months—in fact, so sudden do these strikes and stoppages follow one another, that we are about to recommend that dealers take them as a matter of course, and consider them a part and parcel of the coal trade. It might be that the trade could be carried on without them, but it is a fact hard to realize. We are about preparing a stereotyped article on strikes, which we intend to use every other week hereafter, only changing the location of the strike, as the case may be. Our experience in coal matters has now extended over many years, and eventful years at that; we have had superior opportunities to judge the coal trade under all circumstances, and a chance also to compare its operations with other industries under similar circumstances, but we cannot as yet comprehend or say why the trade is thus continually convulsed. We do not perceive that the coal trade is necessarily more speculative than any other branch of mining industry—iron, lead or copper—and why strikes and turn-outs are purposely gotten up, first in one section of the coal regions, then in another; why corners are formed in the markets; why, in fact, any one in the trade, from those who have control of the large companies, down to the errand-boy of the same, should be using their best endeavors to keep the trade "topsy-turvy" and in a constant state of excitement? We don't exactly like to say it, but the reason must be that the trade is only supporting or profitable when taking dealers unawares, and the only opportunities afforded for such operations is during excitements of the class we have mentioned. The coal trade of late years has become a twin-brother to Wall street or the Gold and Stock Exchange. Failures occur in it almost every week; and credit in it, as we have often before shown, is at its lowest ebb. Cannot these things be remedied? It seems to us that they might. Our business connection in coal affairs has always been with the ten or twelve leading and representative houses of the various branches of the trade in this city and Philadelphia. These gentlemen we never find interested in any of these "sham strikes," etc., but, on the contrary, are always injured in some way or another by them. They naturally complain of these "shysters," who spend most of their time lounging around Trinity Building and other leading coal centres, getting up strikes and rumors of strikes to order, and afterwards, "shark" like, swimming around among frightened unfortunates for their prey. We think a well-organized "Coal Exchange" would give a steadiness and solidity to the trade that it has not now, and never has had or can have without this. From this Exchange could be excluded all these "shysters and demoralizers," and the trade would, in time, be purged entirely of them. Then those dealers who invest capital, and invest it for the advantage of the public, could carry on their business more confidently, with less risk, and at a less cost to the community, and we should have only good coal offered at fair and reasonable prices.

We want a legitimate trade done, and we want to see this speculation stopped. We want it cried down by every respectable dealer, and those who attempt hereafter to thus trifle with legitimate business branded, as they ought to be, and considered unworthy the confidence of any respectable party in the business; and in order that we may perform our duty, we warn all parties that we find thus connected in any of these "nefarious schemes," that we shall make a "special notice" of them, free of charge, and not always draw it light, either.

The principal event of the week just passed was the Scranton sale of 80,000 tons, which took place on Wednesday last. The following is the report of the same:

AUCTION SALE OF COAL.

ADVANCE IN PRICES AND FIRM MARKET.

The Delaware, Lackawanna and Western Railroad company sold at auction at noon to-day, July 27th, eighty thousand tons of Scranton coal through JOHN H. DRAPER. The attendance was large and the bidding lively.

A general improvement over the prices obtained at the sale last month was realized, notwithstanding the impression then existing regarding a scarcity has been removed.

There are said to be a million more tons now on hand than was the case last year at this period. High prices during the coming fall and winter are not anticipated, inasmuch as the laborers at nearly all the mines are at work at satisfactory terms.

The following are the highest and lowest prices obtained at the sale to-day, with a comparison of the rates, for all sizes, at the sale of last month:

1870.		June 29.
12,000 Tons Lump	$4 00	@ 4 07½
10,000 " Steamboat	4 15	@ 4 15
16,000 " Broken	4 57½	@ 4 67½
10,000 " Egg	4 65	@ 4 70
20,000 " Stove	5 10	@ 5 25
12,000 " Chestnut	4 30	@ 4 35
80,000		

1870.		July 28.
12,000 Tons Lump	$4 20	@ 4 37½
10,000 " Steamboat	4 45	@ 4 45
16,000 " Grate	4 87½	@ 4 95
10,000 " Egg	5 00	@ 5 02½
20,000 " Stove	5 50	@ 5 62½
12,000 " Chestnut	4 40	@ 4 50
80,000		

The bulk of the lump sold at $4 30; of the grate at $4 90; of the egg at $5 00; of the stove at $5 50; and of the chestnut at $4 40.

We cannot see the slightest reason for this advance of 30c. The prospects for an increased supply of Schuylkill coal (now that the strike is over) are good. The probability is that the fall will partake somewhat of the character of the summer, and be open and warm, giving us good shipping facilities until late. Our surplus is large and adequate, and it is our opinion that high prices cannot be maintained. We are willing to have coal selling at a fair profit to all concerned, but are opposed to fancy and exorbitant prices. Dealers should buy sparingly now at these "fancy prices." In a few weeks the amount of coal coming forward will be immense, and with Philadelphia and all other points of distribution in active working order, all will be supplied in good time. Keep cool! The advance in this last sale is readily accounted for. A few of our leading steamship agents, who are generally large purchasers of this coal, becoming alarmed at the recent steady state of the market, had made up their minds, or probably a few rumors had convinced them, that now is the time to lay in and store coal. Consequently, in attempting to gobble up all the coal offered at this sale, they had to pay the advance noted, and during the excitement of the sale carried a few silly dealers with them, and we believe they will repent it before thirty days.

PRICES.—Notwithstanding the advance obtained at the sale, there seems to be very little desire by any of our leading dealers for a general advance in prices. The Lehigh Exchange, we learn, have increased their Circular prices some 25 cents above last month; but it is our opinion that more sales will be made during the month at old prices than at the new.

FREIGHTS.—Vessels are in good supply. Prices remain unchanged, and there seems to be no desire to advance rates. We quote: Boston, $1 85 to $1 95; New Haven, $; Providence, $.

Anthracite Coal Trade for 1869 and 1870.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending July 23, 1870, compared with week ending July 24, 1869.

COMPANIES.	1869. WEEK.	1869. TOTAL.	1870. WEEK.	1870. TOTAL.
*Phila. & Reading R.R.	113,579	1,715,919	26,897	1,215,108
Schuylkill Canal	33,053	281,336	3,536	40,339
Lehigh Valley R. R.	62,809	1,186,340	55,601	1,776,531
Lehigh & Sus. R. R.	22,225	387,963	12,194	540,510
Lehigh Canal	34,487	273,724	24,940	273,111
Scranton North		207,062	20,348	386,914
" South	2,958	606,617	33,523	990,851
Penn. Coal Co., rail	21,2.5	533,570	23,744	626,566
" " " canal	955	9,041	716	9,317
Del. & Hud. Canal Co.	21,853	593,962	47,564	779,658
" " R. R.	528	99,345	7,219	261,023
" " south	2,075	51,089	9,076	247,913
Shamokin	10,357	187,704	14,987	206,531
Trevorton		9,448	625	42,855
Lykens Valley Coal Co.	2,130	35,233	6,705	57,141
Wyoming South	13,453	83,954	9,883	127,480
P. N. Y. C. & R. R. Co.			5,729	169,130
Williamstown, Col'y	6,876	89,478	6,749	157,520
Short Mountain	2,753	53,260		
Total	351,318	6,405,025	309,336	7,928,468
1869	309,936			6,405,025
Increase week and year	41,380			1,523,473

* Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1869 and 1870.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending July 23, 1870, compared with week ending July 24, 1869.

COMPANIES.	1869. Week.	1869. Year.	1870. Week.	1870. Year.
B. & O. R. R.	21,028	521,849	15,893	464,478
C. & O. Canal	15,622	287 136	15,129	278 931
H. & B. T. R. R.	9,096	188,626	6,580	166,628
Harrisburg & D.	....	....	16,269	434,012
L. V. R. R.	....	652	1,151	9,380
P. & N.Y. C. & R. Co.	....	....	5,534	134,674
	45,746	998,163	60,556	1,482,903

Schuylkill Coal Trade.

Report of Coal transported via the P. and R. R. for the week ending July 21, 1870—less coal carried for Company's use, and Bituminous Coal:

For week	26,897 16
Previously this year	1,188,210 05
Total	1,215,108 01
Same time last year	1,715,919 00
Decrease	500,810 19
Amount sent same week 1869	113,079 00

Amount of coal transported on the Philadelphia and Reading Railroad for the week ending Thursday, July 21, 1870:

From St. Clair	6,114 04
" Port Carbon	1,864 06
" Pottsville	— —
" Schuylkill Haven	10,577 01
" Auburn	579 00
" Norristown	— —
" Port Clinton	2,875 07
" Allentown and Alburtis	4,997 13
" Harrisburgh and Dauphin	16,269 05
Total paying freight	43,167 01
Coal for Company's use	3,692 15
Total for week	46,859 16
Previously this year	1,616,360 06
Total	1,663,220 02
To same time last year	2,026,800 16

Report of coal transported over the Schuylkill Canal for the week ending Thursday, July 21, 1870.

	Tons. Cwt.
From Port Carbon	— —
" Pottsville	— —
" Schuylkill Haven	3,538 00
" Port Clinton	— —
Total for week	3,538 00
Previously this year	56,801 18
Total	60,339 18
To same time last year	281,336 05

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company, for week ending Saturday, July 23, 1870.

	WEEK.	SEASON.
North	41,801 11	1,259,611 10
South	9,076 04	247,912 14
Total	50,877 15	1,507,524 04
Corresponding time in 1869.		
North	186 07	712,838 02
South	2,074 08	49 371 17
Total	2,260 15	762,209 19
Increase North	41,615 04	Increase 546 773 08
Increase South	7,001 16	Increase 198,540 17
Total Increase	48,617 00	Increase 745,314 05

Report of Coal Transported over Lehigh Valley Railroad

For the week ending July 23, 1870, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREV'LY. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	9,146 07	381,669 06	390,815 11
" Hazleton	47,006 00	1,159,150 11	1,206,816 18
" Upper Lehigh	139 17	7,674 11	7,814 08
" Beaver Meadow	20 894 07	412,078 11	432,172 12
" Mahanoy	3,577 05	132,450 07	136,027 13
" Mauch Chunk		447 17	447 17
Total Anthracite	81,223 16	2,093,471 03	2,174,694 19
Bituminous Coal recv'd from Cats. R. R.			
N. C. R. R.			
E. P. R. R.	1,151 00	8,229 00	9,380 00
P. & N.Y. C. & R.R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	82,374 16	2,101,700 03	2,184,074 19
Same time last year	77,776 05	1,269,694 01	1,347,470 06
Increase	4,598 11	832,106 02	836,704 13
Decrease			
Forwarded East from M'h Chunk by rail	55,601 09	1,710,930 03	1,766,531 12
Same time last year	62,809 06	1,113 531 04	1,186,340 12
Increase	7,207 19	587,398 19	580,191 00
Decrease			

RECAPITULATION.

Forwarded East from M'h Chunk by rail	55,601 09	1,710,930 03	1,766,531 12
To N. C. R. R., at Mount Carmel	67 08	115 00	182 08
Forwarded North from L. & B. Junction	5,739 05	162,960 11	1,68,699 16
To L. & S. R. R. at Packerton for rail	147 16	4,524 15	4,672 11
Delivered at M'h Chunk	11 04	742 05	753 09
Delivered on line of road above Mauch Chunk	95 07	7,421 11	7,516 18
Delivered above M. Chunk for use of L. V. R.R.	850 08	32,179 13	33,030 01
To L. & S. R.R., at P'n Hav., for railroad			
Do. for canal	11,962 03	117,240 02	129,202 05
At M. Chunk for canal	6,748 16	57,357 03	64,105 19
Total Anthracite	81,223 16	2,093,471 03	2,174,694 19
Bituminous Coal	1,151 00	8,229 00	9,380 00
Total all kinds	82,374 16	2,101,700 03	2,184,074 19

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending July 23, 1870—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1870. tons ct	WEEK, 1869. tons ct	YEAR 1870. tons cwt.	YEAR, 1869. tons cwt.
Wyoming Region	18983 14	2 682 10	641131 02	359 83 19
Upper Lehigh Region	3941 16	3130 01	75363 04	65712 16
Mahanoy Region	96 14		785 14	1010 17
Hazleton Region	12301 10	7916 04	134570 14	73:62 13
Beaver Meadow Region	6552 02	6577 12	64110 11	41453 10
Mauch Chunk Region	517 07	16971 03	31099 16	18723 08
Totals	42293 03	57277 10	946770 01	698457 03
Increase	14984 07		248312 18	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	12634 01	22225 10	540510 02	387963 19
Forwarded East of Mch Chunk by Canal	24940 02	34487 04	273111 02	273724 16
Delivered at and above Mauch Chunk	860 07	564 16	22264 08	17978 19
Delivered to L. & B. R. R. at Plymouth Bridge	3798 13		110264 11	13688 03
L. V. R. R. at Sugar N.				5151 03
Totals	42293 03	57277 10	946770 01	698457 03
Of the above there was from Mines controlled by Co., W.B.C. & L.Co	8825 04	18072 04	286979 18	1735112 18
L. C. & N. Co	317 07	13437 17	47752 13	190769 02
Totals	9142 11	31510 01	334732 11	361282 00
Increase	22367 10		29549 09	
Decrease				

Harrisburgh and Dauphin Coal Trade.

The following is the amount of Bituminous Coal transported via the P. and R. R. for the week ending July 23, 1870:

	Tons.
For week	16,269 05
Previously this year	417,742 18
Total	434,012 03

Penn. and N. Y. Canal and Railroad Co.

REPORT of Coal Transported via the Pennsylvania and New York Canal and Railroad Company, for week ending July 23, 1870:

	WEEK.	PREVIOUSLY.	TOTAL.
Anthracite	5,739 05	163,391 13	169,130 18
Bituminous	5,534 00	129,140 00	134,674 00
Total, Ant. and Bit.	11,533 05	292,531 13	303,804 18

Shipments of Cumberland Coal

for the week ending Saturday, July 23, and for the year 1870:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M	.....	.....	.....
Borden	2,165 04	1,818 19	3,984 03
Consolidation	2,693 07	2,631 00	5,324 07
Spring Hill	510 08	.....	510 08
Midlothian	132 05	332 00	464 05
H. and Baltimore	....	634 04	634 04
do Va M	1,476 13	.....	1,476 13
V C & I Co	690 17	.....	690 17
G. C. C. and I	1,102 17	121 14	1,224 11
Maryland	1,277 04	6,528 02	7,805 06
American	1,302 16	4,295 06	5,598 02
Atlantic	579 04	.....	579 04
Piedmont	552 00	.....	552 00
Swanton	1,290 12	.....	1,290 12
Barton	714 00	.....	714 00
Potomac	1,573 00	.....	1,573 00
Franklin	1,934 12	.....	1,934 12
Big Vein	1,879 16	.....	1,879 16
Total week	19,874 15	16 361 05	36 236 00
Previous	500,965 03	305,175 08	806,140 11
Total year	520,839 18	321,536 13	842,376 11

Statement of coal transported over the Cumberland and Pennsylvania Railroad during the week ending Saturday, July 23, and during the year 1870, compared with the corresponding period of 1869:

WEEK.

YEAR.	C. & O. CANAL. Tons. Cwt.	B. & O. R. R. Tons. Cwt.	TOTAL. Tons. Cwt.
1870	15,129 19	15,893 18	31,023 17
1869	15,622 10	21,028 03	36,650 13
Increase			
Decrease	492 11	5,134 05	5,626 16

YEAR.

YEAR.	C. & O. CANAL.	B. & O. R. R.	TOTAL.
1870	273,931 04	464,4'8 05	735,409 09
1869	287,136 04	521,849 05	808,985 09
Increase			
Decrease	13,205 00	60,371 00	73,576 00

Statement of coal transported over the Eckhart Branch Railroad, during the week ending Saturday, July 23, 1870, and during the year 1870, compared with the corresponding period of 1869:

WEEK.

YEAR.	C. & O. CANAL. Tons. Cwt.	B. & O. R. R. Tons. Cwt.	TOTAL. Tons. Cwt.
1870	1,231 06	1,8.3 07	3,044 13
1869	2,080 11	3,.01 16	5,282 07
Increase			
Decrease	849 05	1,388 09	2,237 14

YEAR.

YEAR.	C. & O. CANAL.	B. & O. R. R.	TOTAL.
1870	1,231 06	1,8.3 07	3,044 13
1869	2,080 11	3,.01 16	5,282 07
Increase			
Decrease	849 05	1,388 09	2,237 14

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, July 28.		AT PHILADELPHIA, July 29.	
SCHUYLKILL.	R. A.	W. A.	R. A.	W. A.
Lump	$- —	$5 00	4 50	— —
Steamer	— —	5 00	— —	— —
Broken	— —	5 25	— —	4 25 to 4 40
Egg	5 75 to 6 25	5 25	— —	4 25 to 4 40
Stove	— —to— —	5 75	— —	4 25 to 4 40
Chestnut	4 50 to 5 40	4 75	—	4 00 to —
Pea	— —	— —	—	— —
LEHIGH.				
Lump, (along side)	6 00	— —	— —	— —
Broken	5 75	— —	— —	— —
Egg	5 60	— —	— —	— —
Stove	6 00	— —	— —	— —
Chestnut	5 25	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A.		— —	— —
New England	"		— —	— —
Locust Dale	W. A.		— —	— —
Honey Brook, Le'h	W. A.	5 25 to 6 00	— —	— —
Spring Mountain	" "	5 25 to 6 00	— —	— —
Sugar Creek	" "	5 25 to 6 00	— —	— —
Sugar Loaf	" "	5 25 to 6 00	— —	— —
Old Comp'y's	" "	5 25 to 6 00	— —	— —
Cross Creek	" "	25 to 6 00	— —	— —
Enterprise	" "	— —	— —	— —
Girardville	" "	— —	— —	— —
McMichael	" "	— —	— —	— —
Shamokin	" "	5 50	4 50	— —
Lykens Valley	" "	— —	— —	— —
Broad Top	" "	5 50	— —	— —
Hill & Harris	" "	— —	4 50	— —
Henry Clay	" "	— —	4 50	— —
Powelton	" "	5 50	4 50	— —

[*Dealers in these coals may be found in our advertising columns.]

Prices for Coal at Mauch Chunk.

	F. L.	Bro.	Gra.	Ex.	Sto.	Cst.
Lehigh	$3 00	$3 50	$3 50	$3 50	$3 75	$3 00
Wilkesbarre	3 00	3 50	3 50	3 50	3 75	3 00

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein, f.o.b. at Phila.	$5 00
Lemon " " "	4 75
Cumberland Vein Coal	5 00
Cumberland C. & I. Co.'s on board	N. Y. 7 50
Maryland Coal Co. "	" 7 00
Consolidated Coal Co.'s "	" 7 00

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port						
Pittston at Newburgh	4 30	4 50	4 50	4 60	5 10	4 26
Lackawana at Rondout	4 60	4 70	4 80	5 00	5 25	4 60
*Wilk'b're at Hoboken	4 65	4 75	5 25	5 25	5 75	4 80
Old Co. Lehigh at Pt. Johnston	— —	— —	— —	— —	— —	— —
Lehigh at E. Port	5 75	5 50	5 50	5 50	5 75	5 00

For freights to different points, see "Freights."

* 25c. advance alongside.

Prices at Baltimore—August, 1870.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 30@5 50
Pittston and Plymouth, do	5 00@5 25
Shamokin Red or White Ash, do	5 50@6 00
Lykens Valley Red Ash, do	5 40@5 50
Zerba Valley	25 50@— —
By retail, all kinds per ton of 2240 lbs.	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@5 00
Fairmont and Clarksburg gas, f. o. b. at L. Point	5 35@5 50

Prices at Georget'n, D.C., & Alexandria, Va.

August, 1870.

George's Creek and Cumberland f. o. b. for shipping..$4 55

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— @— —
Lykens Valley	— @— —
Shamokin Red or White Ash	— @— —
Trevorton and Zerba Valley	— @— —

Prices of Gas Coals.

August, 1870.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 73 Pine st., N.Y.

	Duty, $1 25, gold. Coarse.	Slack.
Block House	$1 75	@- 75
Gowrie	1 75	@- 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 50
Lingan	1 75	@- 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Coarse. Currency.	Slack.
Fairmount Gas Coal Co. of N. Y.	7 50	@- —
Despard Coal Co	$7 50	@- —
Penn	— —	@- —
Newburg Orrel Gas	— —	@- —
West Fairmount Gas Coal	8 00	@- —

AT PHILADELPHIA.

Powelton $7 80

Prices of Foreign Coals.

August, 1870.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	10 00@12 00
" House "	13 50@15 50
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel	18 00@20 00

Per ton 2,000 lbs. delivered

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven	$2 00

From Port Carbon, 8 cents per ton more.

Less drawback of 80 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 81
C. R. R., N. J., Easton to Elizabethport	1 12
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 28

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R from M. C. to Easton	$ 81
C. R. R., of N. J., Easton to Pt. Johnson	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 81
Morris & Essex R. R. Easton to Hoboken	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO SOUTH AMBOY.

L. V. R. R.	81
B. & D. R. R.	1 09
Cam. & Am. R. R.	
Shipping Expenses	25
Total	$2 15

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	95
C. RR. of N. J. Easton to Elizabethport	1 19
Shipping expenses	25
Wharfage	10
Total	$2 49

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 07
" Port Carbon	1 10
" Port Clinton	1 00

TO NEW YORK.

From Schuylkill Haven	$1 70

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$0 70
Freight and towage	1 07
Total	$1 77

TO NEW YORK.

Lehigh Canal	$ 40
Morris " } Freight, Towing }	1 10
Total	$ 2,50

TO JERSEY CITY.

Lehigh Canal	$ 40
Morris " Freight	2
	2 40
For re-shipment	2 20
Total	$4 60

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1,25
Towage	20
Total	$ 2,50

TO NEW BRUNSWICK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1.05
Total	$ 2,10

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

TO BOSTON.

Sydney	—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Freights.—AUGUST, 1870.

TO EASTERN PORTS.	From Philadelp'a.	From E. Port and Port Johnson.	From Newburg.	From Rondout.
Amesbury	$2 75	—	$ 1 60	$
Bangor	2 75	—	1 60	
Bath	2 60	2 00	—	
Boston	2 50	1 63	2 00	1 75
Bridgeport	1 60	1 00	1 10	1 20
Bristol	2 00	1 25	1 40	
Cambridgeport	2 50	2 00	—	
Derby	2 00	—	—	
Dighton	1 85	—	1 45	
East Cambridge	2 50	2 00	—	
Fall River	1 75	1 25	1 40	
Hackensack	1 95	1 50	—	
Hartford	2 75	1 35	—	
Jersey City	1 75	50	—	
Middletown	—	1 25	—	
Mystic	1 75	1 25	1 30	
New Bedford	1 75	1 40	—	
Newburyport	2 15	2 00	—	
New Haven	1 70	1 00	1 10	1 20
New London	2 00	1 15	1 25	1 30
Newport	1 75	1 25	1 40	
New York	1 25	50	70	
Norwalk	1 70	1 00	1 05	
Norwich and tow	1 70	1 35	1 35	1 40
Pawtucket	1 90	1 50	1 60	
Portland	2 00	1 75	—	
Portsmouth, N. H.	2 00	2 25	—	1 85
Providence	1 75	1 40	1 45	1 45
Rockport	2 10	—	—	
Saco	2 30	2 10	—	
Sag Harbor	2 00	1 40	1 30	
Salem	2 00	1 60	—	1 75
Stamford	2 00	1 00	1 00	
Stonington	2 00	1 30	1 25	
Taunton	2 75	2 00	—	
Warren	—	1 40	1 45	
Washington	1 10	—	—	
TO RIVER PORTS.				
Albany	—	90	- 60	
Catskill	—	—	- 50	
Cocksackie	—	—	- 50	
Coeyman's	—	—	- 75	
Cold Spring	—	—	- 35	
Fishkill	—	—	- 30	
Haverstraw	—	50	- 60	
Hudson	—	—	- 50	
New York	—	—	- 70	
Nyack	—	50	- 60	
Poughkeepsie	—	—	- 35	
Rhinebeck	—	—	- 30	
Rondout	—	—	—	
Saugerties	—	—	- 40	
Sing Sing	—	—	- 75	
Stuyvesant	—	—	- 55	
Tarrytown	—	80	- 75	
Troy	—	90	- 75	
West Point	—	—	- 35	
Yonkers	—	40	- 60	

Towing Rates.

TO RIVER PORTS.

Boats of 150—250 Tons.	Per Ton.
To Manhattanville	8 cents
Spuyten Duyvil	8 "
Yonkers	9 "
Hastings	10 "
Piermont	12 "
Dobbs' Ferry	12 "
Nyack	14 "
Tarrytown	15 "
Sing Sing	16 "
Croton Landing	17 "
Haverstraw	17 "
Verplanck's	17 "
Peekskill	18 "
West Point	20 "
Cold Spring	20 "
Newburgh	18 "
Poughkeepsie	22 "
Rondout	23 "
Boats of 100 Tons	**Per Boat.**
To Manhattanville, and Return	$11 00
Spuyten Duvvil, "	13 00
Yonkers, "	15 00
Sing Sing, "	20 00
Peekskill, "	25 00

METALS.

NEW YORK, July 22, 1870.

IRON.—Duty: Bars, 1 to 1¼ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, 9 ₱ ton; Polished Sheet, 3 cents ₱ lb.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	31 50@37 00
Pig, American, No. 1	32 00@33 —
Pig, American, No. 2	30 —@31 —
Pig, American, Forge	29 —@30 —
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash
Bar, Swedes, ord'y sizes, less 5 ₱ ct.	— —@110 00
Bar, Refined " "	80 —@ 85 00
Bar, Common " "	75 00@ 80 00
Scroll " "	97 50@130 —
Ovals and half-round " "	100 —@125 —
Band " "	95 —@ — —
Horse Shoe " "	95 —@ — —
Rods, ⅜ to 3-16inch " "	85 —@120 —
Hoop " "	105 —@150 —
Nail rod, less 5 ₱ ct.	— 7 @—7¼
Sheet, Russia, as to Nos. (gold)	— 11½@—11½
Sheet, Single, D. and T. Common	— 5 @— 6
Sheet, Galv'd, Nos. 14 to 26 12 and 14c. Nos. 27, 28, and 26, 15 16c. and 18 19@15 ₱c. off.	
Rails, English (gold), ₱ ton	59 00 @60 00
Rails, American, at Works in Pa	70 00 @71 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 2½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 13
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— — @— 18
American, Spring, do.	— 9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 30
Copper Bolts	— @— 30
Copper Braziers, 16oz. and over	— @— 30
Copper Nails	35 @— 36
Copper, Old Sheathing, &c., clean	— @— 17
Copper, Chili Pig	— @— —
Copper, American Ingot	20 @— 20¾
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1¼ cents ₱ lb; Pipe and Sheet, 2¾ cents ₱ lb.

Galena, ₱ 100 lbs	$— — @— —
Spanish (gold)	6 35 @6 40
German, do.	6 35 @6 40
English, do.	6 35 @6 62½
Bar (net)	— @8 00
Pipe and Sheet (net)	— @8 00

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

	Gold ₱ lb.
Banca	32½@—
Straits	37¾@38
English	33 @—

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ₱ box	$8 75 @9 —	$10 75 @11 25
I. C. Coke	7 — @7 75	8 75 @ 9 75
Coke Terne	6 — @6 25	7 50 @ 7 75
Charcoal Terne	7 75 @8 25	9 50 @10 25

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ₱ 100 lb

	Gold.
Plates, Foreign ₱ 100 lbs.	$6 37½@6 50 0
Plates, Domestic ₱ lb.	07½@- 10½

REMARKS.

IRON.—Scotch Pig is offered lower, but the demand is light, and we have only to report a sale of 460 tons Eglinton, on private terms. American is inactive, and nominal at previous quotations. Ralls are in moderate request at former quotations—5500 tons, old, delivered at the West, sold on private terms. Bar from store continues to be held at $80 for Refined, ordinary sizes, and $85 for ¾ inch. The market in Philadelphia continues very strong—125 packs Russia Sheet sold from dealers' hands at 11½ cents, gold.

TIN.—There has been considerable business in English Pig at the recent reduction in prices, and we notice sales of 25 tons at 33 cents, gold, and 12 do., on private terms. Straits is steady at 37¾@38 cents, gold; 1500 slabs sold in Boston, to arrive here, at a reserved price. Banca is quiet and nominal, at 38½ cents, gold. Plates are not so active, but there is still a fair business at firm prices; we notice sales of 1000 bxs. Charcoal Tin at $8 75 @ $9 for I. C.; 250 do. Charcoal Terne, $7 75, gold; and 740 do., I. C. Coke, on private terms.

LEAD.—The demand for Foreign Pig continues quite active, and prices are firm at the advance previously noted; 100 tons Refined German, here and to arrive, sold at $6 72½, gold; and 115 do., Spanish, $6 35 @ $6 40. The tendency of prices is still to harden, but owing to the parcels that the Government is placing on the market, no further advance has been established; 250 tons Bullets were sold on Saturday last, at auction, at $5 75 @ $6 40 currency, and we understand that from 250 to 500 tons will be offered every week until further notice, the Government having a large amount of Pig Lead and Bullets to dispose of in this manner. Bar, Pipe and Sheet may be quoted 7½ @ 8 cents, net cash.

COPPER.—New Sheathing is steady at 30 cents, and Yellow Metal 22c. cash. Ingot has sold more freely, but there is not much life in the market, and prices are without quotable change. Sales have been made of 350,000 lb. Lake at 20¼ cents; in small lots, 20¾ @ 20½ cents; and 25,000 lb. Tennessee, 20¼c.; Baltimore, 20c. cash.

SPELTER.—The market for Foreign remains quiet, but steady, at the advanced rates. We have only to notice a sale of 15 tons Silesian at 6¼ cents, gold. There is more inquiry for Domestic, and prices have appreciated. We quote Missouri, 6½ cents, gold, and Lehigh 11 @ 11½ cents, currency for Nos. 1 and 2.

ZINC.—Sheet, from store, commands 10½ cents, currency. The price of Mosselmann has been advanced to 8½ cents, less 4 per cent., gold, and no orders to be taken without conferring with the Company at Antwerp.

Mining Stocks.

NEW YORK, July 29, 1870.

We have but little change to note in mining stocks this week. Colorados are a little stronger, Consolidased Gregory being now quoted at 75 @ 80 cents. Mariposa continues to decline, touching 10 @ 10¼ for Preferred. The following is the list of quotations issued by the board:

	Bid.	Asked.
Bates and Baxter	15	—
Benton Gold	5	—
Black Hawk Gold	25	—
Central Gold	27	29
Consolidated Gregory	75	80
Grass Valley	40	45
Gunnell Gold	15	—
La Crosse Gold	08	—
Liberty	02	03
Mariposa	05⅛	05⅝
Mariposa pfd	10	10¾
Quartz Hill	20	—
Symond's Forks	—	75
Smith & Parmelee Gold	50	—
Quicksilver	04¼	—
Quicksilver pref	—	12
Wa kill	03	—
Walkill assented	05	—
Rutland Marble	25	25½
Lehigh & Susquehanna	1 10	—

Petroleum stocks continued without much change:

	Bid.	Asked.
Bennehoff	—	—
Bergen Coal and Oil	40	50
Bliven Oil	40	—
Blood Farm	—	—
Brevoort	2 00	—
Buchanan Farm	45	50
Central	40	56
Clinton	—	—
Home Petroleum	2 00	2 50
National	25	—
N. Y. & Alleghany	2 25	—
Northern Light	—	75
Pithole Creek	1 00	1 35
Phillips	15	25
Rathbone	—	40
Rynd Farm	28	32
Second National	—	75
Tar Farm	20	—
United Petroleum Farms	20	25
United States	75	80

San Francisco Stock Market.

We have the following list of quotations by telegraph from San Francisco, bearing date July 27.

Savage	33¼	Gould & Curry	—
Yellow Jacket	28	Belcher	No sales.
Kentucky	31	Imperial	39
Chollar Potosi	35½	Amador	No sales.

The Slate Trade.

NEW YORK, July 29, 1870.

From the Slatington region, our correspondent writes us business is very dull, and things of course rather discouraging—still, when the general dullness of the times are taken into the account, there is not so much of which to complain. We note, as an item of interest, that the 14 squares of roofing-slates shipped by H. W. HARPER, were sent directly to San Francisco, Cal. This is, if we are not mistaken, the first shipment from this region to the Pacific coast.

[Corrected weekly.]

PRICES OF ROOFING SLATE.

(A "square" represents 100 superficial feet.)

Vermont purple, 1st quality, per square	$9 50@10 50
" green, 1st " "	9 50@10 50
" red, 1st " "	15 00@16 00
" variegated, "	8 5 @ 9 50
Pa. b'k and d'k blue, 1st qual., "	7 00@ 8 00

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending July 23, 1870.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Jones & Williams	350 squares.
Locke Slate Co	105 "
Girard Slate Co	105 "
Eagle Slate Co	70 "
D. Thomas	70 "
D. Williams & Co	35 "
Lehigh Slate Co	35 "
Total	760 "

SCHOOL SLATES.

D. Williams	26 cases.
Locke Slate Co	50 "
Lehigh Slate Co	1 "
Total	77

BLACK BOARDS.

Yerkes & Martin	18 "
Lehigh Slate Co	5 "

MANTLES.

Lehigh Slate Co	31 "
Yerkes & Martin	6 "

LEHIGH AND SUSQUEHANNA R. R.

ROOFING SLATE.

Twin City Slate Co	175 squares.
T. W. Parry	175 "
Eagle Slate Co	70 "
H. W. Harper	14 "
Total	434 "

LEHIGH CANAL.

SCHOOL SLATES.

A. W. Lerch	956 cases.

	Week.	Previously.	Total for Year.
L. and S. R. R.	434	4,439	4,862
L. V. R. R.	760	10,545	11,305
Lehigh Canal	..	762	762
Total	1 194	15,763	16,930

New Telegraph.

The London *Telegraph*, of July 12, says: "A novel kind of telegraph, the invention of Signor GUATTARI, an Italian, was submitted to the inspection of a party of scientific gentlemen yesterday. The inventor aims at obtaining by the use of atmospheric power the same or better results than those obtained by electric and magnetic forces. To this end he charges a reservoir with compressed air, and by the operation of valves worked in the same manner as those in use in the ordinary telegraph system, sends pulsations through a tube, which pulsations are made to work upon the receiving instruments with an effect corresponding with that of the electric current passed along insulated wires. The invention has been so fully recognized by the Royal Institution of Naples that they have paid to Signor GUATTARI the rare compliment of awarding him a gold medal. It is futher reported that the system is to be generally adopted on board the Italian ships of war for the transmission of orders from the commanding officer to subordinate departments. At the experiments yesterday there were present the Italian Ambassador, Count MAFFEI, a gentleman from the engineering department of the Postal Telegraph, a representative of the Kensington Art Department and contributors to scientific journals and the general press. The working apparatus was all contained in a stand or table about eight feet long by five wide and four deep. Air pumps, worked by a crank, are used to charge the reservoir. The amount of pressure is shown upon a dial. The telegraphic instrument is worked by hand in the ordinary way. A very considerable pile of gutta percha tubing, half an inch in diameter, and said to be about a mile in length, was connected with the instrument at the battery and with two other instruments in the room.

"The experiments began by the charging of the reservoir to about one-sixteenth of its actual capability, this being, at the same time, a comparatively crude, though not unsightly, machine. The method for the working of the Guattar is the MORSE, or printing cipher system. Signor GUATTARI, at the transmitting end, sent through this message: 'This apparatus has already experimented on the plebiscite.' The words were recorded in cipher at the receiving end, and were read off by the gentleman from the post-office, who remarked, however, that, in two or more instances, the letters had run into each other. The same authority found the valve at the transmitting end difficult to work, and requiring a manual pressure of something like seven pounds, instead of the mere touch required by the regular Morse instruments. In operating on it himself, he sent through the alphabet correctly, and transmitted all the messages he attempted with accuracy. This was done through a line of tubing partly wound round a drum, and partly lying in an irregular heap on the floor. In actual service, lead tubes might be used.

"Experiments were next tried on the apparatus for communicating with various parts of a ship, and subsequently with what may be called the domestic telegraph. In this case Signor GUATTARI dispensed with the use of the reservoir, and, by mere manipulation of an air ball at the end of a tube recorded true cipher characters on the long strip of paper which runs over the small wheels of the receiving instrument. This is the kind of telegraphy to which the Guattari apparatus will probably prove best adapted. In large hotels, in ships of war, in communication from factories to counting houses, from private residences to places of business, and in town communication generally, the system promises to be advantageous. It is independent of foreign aid, is less likely to get out of order than wires conducting electric currents, and will not be more expensive.

"For longer distances, on regular public lines, the invention would probably not apply so well, or work so rapidly, as the present telegraphs. The inventor is, however, equally sanguine in this as in smaller branches, and claims, not without reason, that his apparatus will be less expensive than electric batteries, and will be less subject to the influence of those atmospheric storms which sometimes put the telegraphic system of a whole country out of order. The new telegraph certainly reflects high honor on the inventive genius of its originator."

The Chemical Corrosion of Iron and Steel.

IT has been generally admitted that the action of diluted acids, and of sea water, is more rapid upon steel than upon wrought iron; but a series of experiments made by Mr. HENRY BESSEMER some years ago, showed that there was an important point in favor of steel, viz.: the uniform action of the chemicals upon the whole exposed surface of the steel plate, as compared with irregular local corrosion concentrated upon certain places of the iron plate. Mr. BESSEMER immersed pieces of steel plates and of iron plates in vessels which were filled with diluted acids, and with solutions of different salts. From time to time the plates were removed and examined. The action of the chemicals upon the iron and steel was strikingly different. The steel plate showed an uniform, close-grained texture all over its surface, and under the microscope the steel surface appeared of a homogeneous, crystalline structure. In the case of the iron plate, on the other hand, the chemical action had made more rapid progress at all the minute fissures and openings which represent the welds or the interposed layers of oxides or slags existing between the individual crystals of the wrought iron; and the appearance even to the naked eye showed that peculiar irregularity of surface which is frequently produced upon iron in the process of etching or "damascening." The microscope still further disclosed that the wrought-iron surface was furrowed to a greater or less depth in certain places, upon which the chemical action seemed to have concentrated its effect, and which therefore formed points of weakness, the existence of which in a plate would be far more dangerous than the corrosion of steel, which spreads equally over the whole surface. * * Some very interesting experiments have been recently carried out in France at the works of the Terrenoire Company near St. Etienne. * * The samples were immersed in sea-water, and the effect of the chemical action was put to an immediate quantitative test by means of a galvanometer. * * * The amount of electric force which was measurable by the galvanometer, was in direct proportion to the quantity of chemical action which took place between the sea-water and the plate, and the indication of the galvanometer gave therefore the exact proportionate amount of corrosive effect produced by the sea-water upon each of the plates. These experiments have confirmed the fact that the corrosion of steel containing more than one third per cent. of carbon is more intense than that of wrought iron, but the corrosion of the softest kinds of steel, containing from one-third per cent. of carbon downward is less than that of wrought iron. In fact the amount of corrosion of different kinds of steel seems to follow the exact proportion of the percentage of carbon contained in the metal.

The evidence of these galvanometric tests has been still further corroborated by keeping the different plates immersed in sea-water for several months, and ascertaining the loss of weight of the plates regularly every week.

The experiments show in a very conclusive manner that soft-steel plates, such as are usually—and ought to be always—employed in ship-building, are less liable to suffer from the corrosive action of the sea-water than iron plates. The advantage of the steel plates previously pointed out by Mr. BESSEMER is, therefore, still further enhanced by this newly-discovered superior resistance to corrosion, which is a property of the softest kind of steel.—*Engineer.*

Letter from Professor Roessler.

TO THE EDITOR: Sir—It affords me pleasure to inform you of my arrival in this city from an expedition into the North Western portion of the State of Texas, which began under the most auspicious circumstances and with all assurances of success. Unexpectedly it came to a sudden termination, being interrupted by a band of hostile Indians, who made an attack upon our party, in which I had a narrow escape from death. Nevertheless I cannot help being convinced, that my labors during the brief period of my stay in that region, will in the end prove beneficial to the State and the country at large.

I herewith enclose you a bill for the construction of a Geological Survey of Texas, which I had the opportunity to prepare, and have passed, while in Austin, by both branches of the Texas Legislature. Should a proper person be appointed to this most important office, the votaries of geology will be agreeably surprised with the abundant harvest in store for them. There is no State in the Union offering such a variety, and so interesting a field for a geologist. It is well-known that the State contains a complete series of geological formations ranging from the Potsdam sandstone up to the latest tertiary, with an abundance of organic remains and an immense mineral wealth as yet undeveloped and hardly known to the people of the State themselves.

During my exploring tour through Archer county, I found extensive deposits of native bismuth, and was amazed at the grand panorama of the outcropping permian formation afforded me on reaching the three forks of Little Wichita river in the same county. An interesting copper ore was found to crop out in the sides and summits of the hills in such quantities, that all previous statements on this subject are not only true, but fall far short of the reality. This copper deposit is found in Archer, Wichita and Haskell counties. The ores are similar to those found in the "Kupferschiefer," at Frankenberg, Hessia, and at other European localities. They are pseudomorphous, after wood or a vegetable substance, and contain 55·44 of copper, little malachite, carbonaceous matter and oxide of iron. The veins, which have been traced along the summits and sides of the hills, run nearly parallel with the strata, but there is sufficient evidence that they partake of the nature of veins. A shaft was sunk on the Little Wichita river, Archer county, to the depth of 15 feet, and ten hours' work resulted in the raising of 6000 pounds of rich copper ores. The geological formation in which this ore occurs, is the permiam. It is extensively developed in that region and of the utmost interest, as it is known to be rich in copper, nickel, and cobalt ores in other parts of the globe.

At all points of out-crops, I have made careful sections of the strata within reasonable distances of the route travelled; the thickness, stratigraphical order, dip mineral and fossil character of the various beds have been determined with as much precision, as my limited time allowed. Much attention has been devoted to the agricultural capacity, topographical features, the kind and quantity of timber of the district explored and heretofore unknown. I have noted upon the departmental map localities of workable mines, ore deposits, coals, lignites, marble and stone quarries, medicinal and other springs, and boundaries of timber and prairie. On the waters of Big Wichita river I found the fossil remains of a complete skelton, of an indescribable species of the genus "*Elephas*," greatly superior in size to that of *Elephas primigenius*, mastodon, or any other known species; and my collection of cretaceous, permian and carboniferous fossils is very extensive aad interesting. I have positive assurances that the Indians will soon be driven out of the State, as the Legislature of Texas has organized and equipped several regiments of rangers for that purpose. I am in hopes, therefore, that the interesting remains of the "monster of the past," from the Wichita waters, will soon be removed to a point of safety; it will undoubtedly be a valuable acquisition to science.

I shall commence a report of my labors during my three months absence as soon as my collections arrive.

A. R. ROESSLER.

WASHINGTON, D. C., July 18, 1870.

Survey of the Nicaragua Route for a Ship Canal.

BY COL. O. W. CHILDS, C. E.

[Continued.]

THE general merits, therefore, of all the routes thus far projected leading from the lake of Nicaragua to the Pacific, as ascertained in the manner and to the extent above indicated, were, at this stage of the proceeding, duly considered, and the conclusion was arrived at, that the line leading from the lake at the mouth of the River Lajas to the Pacific at Brito, presented more favorable conditions for the construction of the canal than any other. It was therefore determined to survey and carefully to locate a line across upon this route.

The River Lajas has its origin about ten miles southwesterly from its entrance at the lake, on the eastern slope of the dividing ridge, and after running northwesterly some two miles along the base of the hills, it takes a more northerly direction through comparatively level savannahs, to some extent variegated with conical hills and occasional low ridges, a distance of some six or eight miles to where it bends to the east, and in a distance of 1¾ miles by a good direction it enters the lake.

The River Grande rises on the easterly slope of the same range of hills, and some two or three miles northwesterly from the sources of the Lajas, and after flowing near the base of the slope some three or four miles, it bends to the west, and by a narrow and somewhat irregular valley it passes through the ridge, and thence in a more capacious and uniform valley to the Pacific.

The survey was commenced at a point on the bed of the lake, seventeen feet below the elevation at which its surface stands during ordinary high water, and at which, by the plan, it is to be permanently maintained; to this surface all comparisons of elevation and depression refer. This point is twenty-five chains from the line of the shore, and directly opposite the entrance of the Lajas: the bottom, which here is a compact gravel, rises by a gradual inclination to the surface of a gravel bar lying upon the line of the shore across the Lajas, and elevated a few feet above the surface of the lake. This bar is alternately formed and removed, or levelled down; the former by the action of the waves during the dry portion of the season, and the latter in the wet season by the force of the current in the Lajas, which opens a channel some two hundred feet in width and four to six feet in depth. The cut to be made through this bar will require protection by a pier constructed on either side, and extended to deep water in the lake. These piers and the cut may be so located as, when completed, will furnish a practicable and safe entrance to the canal.

The river immediately in rear of this bar has a depth of 11 feet in time of low water; it has an average depth of about 10½, and a width of 100 feet a distance of 1.54 miles, to the point of divergence of the line at a bend in the river, a few chains above which the plan contemplates an embankment, by which the stream is to be turned into an artificial channel to be cut on the south side, and leading to the lake a few chains south of the present entrance of the river. With the exception of a single point to be cut through, the line as located occupies the present channel of the river, which will require to be enlarged from deep water in the lake 1.85 miles to the bend above referred to. The bottom width of this cut is calculated at 100 feet.

With the stream turned as proposed, it is not supposed that this portion of the canal will be subject to deposits of earth, or that the navigation will in any degree be intercepted by the subsequent formation of bars at its junction with the lake.

The ground surface on the bank of the River Lajas, at the point of its divergence, has an elevation of five feet above the surface of a high water in the lake: from thence the line as traced along up a generally broad and very uniform plane in the direction of the Rio Grande, reaches the summit between these streams by a good direction in a distance of 3.75 miles, and with an ascent of 41 feet above the bank at the point of divergence at the river, or 46 feet above high lake. The valley at this summit is nearly level at right angles with the line, and has a width of about 1½ miles. Proceeding from the summit with the same general direction and uniformity of surface, the line by an easy curve bends to the right, and crossing the Espinal, a small though permanent brook to be taken into the canal from the north, reaches the banks of the Rio Grande in the further distance of 1.78 miles, with quite a uniform descent from the summit of 26 feet, or at a distance of 7.38 miles from 17 feet depth of water in the lake, and with an elevation of 20 feet above its surface.

The stream here approaching the line from the south, takes a more westerly direction, and descending at the rate of 9.82 feet to the mile, passes with many sinuosities through the dividing ridge in a valley of little greater width than is necessary for the canal and the deposit of the surplus material excavated from its prism. The channel in which the stream flows is about 70 feet wide and 15 feet deep, and in its serpentine course alternately approaches the bases of gently sloping spurs projecting from the main hills on either side. The bed of the channel at the first point of intersection by the line is two feet above the surface of high lake. The stream is here to be received into the canal, and the line thence is located intermediate the valley, leaving the channel alternateiy on opposite sides a distance of 1.45 miles, to where the bottom plane of the channel is depressed 19 feet below the surface of the lake.

The point of excess of cutting having been passed, the line leaves the channel of the creek to the left, and with about the requisite depth of cutting, is traced across a lateral valley over a favorable surface 0 54-100 miles, to where it again enters the channel of the Rio Grande, which from this point, with its bed 28½ feet below the surface of the lake, passes through a narrow opening in another ridge, furnishing for the line a favorable location a distance of 45 chains, where by a slight curve to the right it again leaves the channel of the stream, and enters the head of a ravine of favorable dimensions and elevation, which it pursues a further distance of 12 chains to the lock located at the termination of the summit level, 10.9-100 miles from 17 feet depth of water in the lake. Eight chains below the point of divergence of the line from the creek, a dam is to be constructed across the stream, by which its waters are to be raised and maintained at the same elevation as that of the lake.

The quantity of water passing in the Rio Grande during its maximum flow, as calculated from the highest water-mark found on the face of its banks and its known width and descent, is 5,670 cubic feet per second. This quantity, on being received into the canal, will, owing to the difference in conditions of flow, pass in somewhat unequal portions into the lake, and over the dam at the west end of the summit level with a depth on the crest of the dam of 1.65 feet, it will move with the same mean velocity in both directions, or about 1.42 miles per hour. This stream very seldom rises to the height here assumed as its maximum flow, and the very limited and highly inclined surface of the country drained by it is such that it continues at this height only a few hours. During a large portion of the dry season, the water in that portion occupied by the canal percolates through, and none passes over the gravel bars distributed along its bed. It would be desirable in this, as in all other cases, to avoid streams, however small, not beneficial as feeders to the canal. In the present instance this could not, by reason of the limited space in the valley before described, with propriety be done. With the weir so constructed as to prevent the influx of earthy matter, and the consequent formation of bars, it is believed that the receiving of this stream into the canal under the peculiar circumstances of flow will not be seriously detrimental to navigation.

Proceeding from the first lock, the line is traced along the centre of the ravine, which gradually widens, and with a uniform and moderately descending surface, again unites with the more immediate valley of the Rio Grande, which here has a northerly direction. The line is thence continued along the easterly side of the creek 1.50 miles to the point of extreme northing made by the stream, where it curves to the west, and with a good direction over a highly favorable surface, it reaches the river Tola in a further distance of 1.42 miles, a stream considerably less than the Rio Grande, and which is to be received into the channel from the north. The river Grande is to be turned by a short cut, in alluvial earth, on its south side, across a projecting point of the flat. The canal also occupies a portion of this point, and with the present channel of the creek forms a somewhat spacious basin, in which the Tola is to be received and discharged on the opposite side of the canal, over a weir to be constructed of such length as will prevent the water of the Tola, in time of floods, from elevating to an injurious extent the surface of this level of the canal.

A towing-path bridge will be required across the channel of the Tola. The line is thence continued along a moderately descending and broad flat, having a general elevation of eighteen to twenty feet above the stream 1.84 miles to where it crosses a spur branching from a high ridge, forming the westerly bounds of the valley of the Tola. After passing a gap in the spur, involving a cut thirty-three feet in depth, and two chains in length, the line in a further distance of twenty-nine chains again enters the channel of the Rio Grande, which, by a short cut, is to be turned, and its present channel occupied by the canal six chains to opposite the abrupt termination, at the north side of the creek of another spur of the ridge. Leaving the creek at this point, the line, by an easy curve to the right, is extended westerly through broad internal lands 1.95 miles; thence in a southerly direction 0.60 miles to where it enters the channel of the river Grande, in which it continues a further distance of seventeen chains to the location of the lower or lock No. 14, connecting with the lowest tide-water of the Pacific. About sixteen chains easterly from this lock the creek, by an embankment, is to be turned into an artificial channel to be cut in earth 0.52 miles across a low flat to the Pacific, at a point 0.62 miles southerly from its present termination, and the canal or artificial harbor is to occupy a portion of the old or present channel from the lock forty-seven chains to the line of the coast; thence 0.263 miles to seventeen feet depth of water.

The whole length of the line described and as located, from seventeen feet depth of water in the lake to the same depth in the harbor at Brito is 18.90 miles, and from the former to the latter coast the distance is 18.325 miles.

The whole fall from the surface of ordinary high lake to the Pacific at the surface of the highest tide observed, is 102.92 feet, and to the lowest tide 111.47 feet. This latter descent is to be made by fourteen locks of eight feet lift each, except No. 14, connecting with tide-water, which is 7.47 feet. They are distributed at favorable locations for construction and subsequent use, and with the exceptions before noticed, the excavation in the several levels between the summit and Brito does not largely vary from the amount required in the banks, and the bottom of the levels, except the three lower, is sufficiently elevated to admit of being drained into the creek.

The material to be excavated at the junction of the river Lajas with the lake is, as before stated, supposed to be gravel; this is indicated by the gravel surface of the bed of the lake, and of the creek immediately in rear of the bar, the latter of which being only one foot above the bottom of the canal. The dip of the rock which appears above the water at the shore of the lake within ¼ of a mile upon either side, more especially indicates the absence of this material in the line of the channel of the creek at, and several chains back from, the lake. Some rock will be encountered in a short cut through the point at a bend in the stream, and in lowering the bottom between this bend and where the line leaves the channel of the creek.

From this latter point, borings were made along the line the entire distance to Brito Harbor, sufficiently frequent to indicate the amount of rock to be excavated. They were, in all cases where no rock was found, carried to the bottom of the canal; and where rock occurred, the earth covering it was bored through, and the rock was penetrated only so far as was necessary to determine its general character at the surface as to being of difficult or easy excavation.

Rock was found in all that portion of the line between the Rio Lajas and the Rio Grande, underlying a covering of earth, varying from six to fourteen feet in thickness. The rock at no point approaches the general surface: it was visible only in the bed of the deep channel of a brook about two miles west from the Rio Lajas; through the summit it consists principally of a wacke, or a variety of trap, apparently harder on the easterly than on the westerly side. A considerable portion of it may be quarried without blasting; the remainder may be readily drilled and blasted.

But little rock will be encountered west of the point of receiving the Rio Grande into the canal, and none worthy of note from where the bottom plane of the canal crosses the bed of the creek, to the termination of the summit level. The borings disclosed no rock between this latter point and the Pacific, and it is believed that in the construction of the canal it will not be necessary to excavate any considerable quantity.

The lock-pits will all be in earth, and in the bottom of those between the summit and the Rio Tola, six in number, will be what is termed dry and sufficiently compact and firm to sustain the foundation of the locks; a portion of the remaining eight located west from Tola will require bearing piles to sustain them. Two culverts will be required on this part of the line.

[TO BE CONTINUED.]

THE ENGINEERING AND MINING JOURNAL.

CONTENTS FOR THIS WEEK.

[*Illustrated Articles are marked with an asterisk.*]

*An Ammonia Engine	65	Letter from Professor Roessler.	72
Analysis of Some Hitherto Undetermined American Minerals.	66	Survey of the Nicaragua Route for a Ship Canal	72
*The Coal Fields of the Rio Grande do Sul, Brazil	66	EDITORIALS:	
A New Method of Straightening High Chimneys	67	The Geological Survey of Texas.	73
MINING SUMMARY	68	Brazil	73
ON-DIT ABOUT MINES AND METALS	69	Colorado Bullion	73
SPECIAL SCIENTIFIC BREVITIES	69	New Publications	73
MISCELLANEA	69	Trials of Coals for Producing Steam	74
MARKET REVIEW	70	OFFICIAL LIST OF PATENTS	75
THE SLATE TRADE	71	New Method of Working Scrap Steel	76
New Telegraph	71	The Chassepot Gun	76
The Chemical Corrosion of Iron and Steel	71	BUSINESS AND PERSONAL	76
		ADVERTISEMENTS	77

ROSSITER W. RAYMOND, Ph. D., Editor.

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.*

SUBSCRIPTION—**$4** *per annum in advance;* **$2 25** *or Six Months.*

ADVERTISEMENTS.—*The rates are as follows: Inside pages,* **25** *cents per line each insertion; the outside or last page,* **40** *cents per line. Payment required in advance.*

NEWS-DEALERS *will be supplied through the agency of the* AMERICAN NEWS COMPANY, *No.* 121 *Nassau street, New York City.*

COMMUNICATIONS *of all kinds should be addressed to the Publishers. The safest method of transmitting moneys is by checks, or Post-office orders, made payable to their order.*

Correspondence and general communications of a character suited to the objects of THE ENGINEERING AND MINING JOURNAL *will always be welcome.*

The Postage on THE ENGINEERING AND MINING JOURNAL *is twelve cents a year, payable quarterly, in advance, at the office where received.*

GEO. E CUMMINGS *is our Agent at Philadelphia. Office,* 429 *Chestnut street.*

WESTERN & COMPANY,

Publishers and Proprietors,

37 PARK ROW,

P. O. Box, 5969. NEW YORK CITY.

The Geological Survey of Texas.

IN a recent number of the JOURNAL, we reported the attack by Indians upon Dr. ROESSLER and party, who were engaged in making an examination of the copper and coal veins of the State of Texas. Last week we were favored with a call by the Doctor, who gave us an account of his narrow escape, and also a brief but interesting description of the mineral resources of that State. The attack by Indians took place after the copper mines and coal fields had been visited, and not on the outward trip, as we supposed when we alluded to the subject before, so that the cause of science loses but little, though several of the party were killed and Dr. ROESSLER himself only escaped by feigning death.

In another column we give a short account of the trip by the Doctor, who promises us shortly a more detailed communication. The discovery of coal in the hitherto little explored and comparatively unknown region of northern and north-western Texas, will be a matter of vast importance to the Southern Pacific Railroad, and through it to the general welfare of the country. The direction of the originally proposed road has been slightly altered, so as to run directly through this field, without materially increasing either its cost or length. The Doctor says that the specimens which he gathered on his trip have arrived, and that many of them he finds on second examination to be better than he at first supposed.

While in Texas, Dr. ROESSLER also found time to prepare a bill which was passed by both Houses of the Legislature, providing for a State geological survey. A geologist is to be appointed by the Governor, with a salary of $3,000 a year, which will probably be increased to $4,000. He is to give bonds to the amount of $20,000 for the faithful performance of the work and the proper use of the appropriation of $12,000 a year, which is placed under his control. Two principal assistants, with salaries of $1,800 each, are also to be appointed, and as many subassistants as may be deemed necessary, the expenses of the party, while in the field, to be defrayed by the State.

Another item of the bill, highly important to the cause of geology, is the one which provides for the collection and classification of duplicate specimens by the members of the survey, and their subsequent distribution to the mining and scientific schools of the greatest reputation throughout the country. If every state was equally liberal, we should have in this country some of the finest palaeontological collections in the world. The members of the survey must neither directly nor indirectly make use of the knowledge, acquired in the service of the State, for their own advantage; in other words, they must not take part in any speculations in mineral lands. Annual reports are to be made to the Governor, and printed at the expense of the State. They are to be sold at cost price, and the money arising from the sale is to be devoted to the common school fund. The Governor also has the power of removing the chief geologist for neglect of duty or inefficiency, and also of appointing his successor.

Dr. ROESSLER says that among other very interesting fossils he found the skeleton of an immense elephant, but as he lacked transportation for any more than a few teeth, he was compelled to leave it behind. The size of the creature can be inferred from the fact that its jaw-bone measured twelve feet in length. Possibly no other State in the Union offers so interesting and extensive a field for observation as Texas. From the Potsdam sand-stone to the newest tertiary formations, all the strata are represented; hence the labor involved in their scientific determination will be very great, and a commensurate reward, in reputation if not in money, will await the geologist who carries the work to a successful close. If the arrangement of the strata is clear and well defined and developed, the geology of Texas may be taken as the standard of comparison for the whole United States, in which case an excellent opportunity would be afforded for a good geologist to make a world-wide reputation.

Brazil.

WE give in this number a paper by ROBERT HEUSCHKEL, M. E., who has spent the past year in traveling through the southern part of the Brazilian Empire. It is the most reliable and accurate report on the subject with which we are acquainted. Lying so near to navigable rivers and bays, it certainly appears that the day cannot be far distant when the immense coal seams described, will be of great commercial value, notwithstanding the inherent laziness of the native population. At all events the question mooted long ago by certain ethnographers, whether the races inhabiting the temperate zone of the southern hemisphere were indolent and shiftless because they had no coal, will soon be capable of solution. The time when the English and other productive coal fields will be exhausted, is so often rung in our ears, and the probability that we will some day perish for lack of coal to build a fire, unless some more abundant fuel is discovered, is so often vaguely advanced by croakers to frighten the timid, that we always hail with pleasure the discovery of new fields, even though they may not be of immediate practical importance.

Colorado Bullion.

IN another part of the present number we republish the gold-shipments from Gilpin county, Colorado, for the fiscal year from July, 1869, to July, 1870. The returns in comparison with those of former years, show that mining in that territory has become a legitimate business, which is slowly but steadily increasing. This must be the more gratifying to the Coloradans, as they owe this result to their own industry and perseverance, and their scrupulous care in avoiding to meddle with any of the countless new processes, invented for their special benefit by hundreds of would-be metallurgists, the majority of whom had probably never seen a mine, or comprehended the reactions taking place in the extraction of the precious metals from refractory ores. Most of the beneficiating works use only the old processes which, by their use for ages, have been proved to be economically effective; and only such late inventions as have been established under their very eyes to be really meritorious are beginning to be introduced. We refer especially to the BRUCKNER cylindrical roasting furnace, several of which are now in successful operation in Colorado. Mr. STETEFELDT's chloridizing roasting furnace, we are informed, has not been introduced in the silver mining districts of the Territory thus far, although it gives excellent results in Nevada, according to all accounts. The reasons advanced are, that the owners of the patent demand too high a royalty, principally, however, the great capacity of the furnace. It is claimed, that all the silver mines around Central City do not produce ore enough to supply one Stetefeldt furnace continually. Under these circumstances it is certainly wise to wait with its introduction until the capacity of the mines has been so enlarged as to make the *continuous* running of the furnace possible, a point to which the more importance attaches in Colorado, since the question of fuel is one of life or death to the working of most mines containing refractory ores.

New Publications.

WE have received a Report of the Coals and Iron Ores of Pictou county, Nova Scotia, by EDWARD HARTLEY, F. G. S., Mining Engineer to the Geological Survey of Canada. Published by DAWSON BROTHERS, Montreal. B. WESTERMANN & Co., New York.

In the geological survey of Canada a prominent position is very justly accorded to the iron and coal industries, and the reports on these branches seem to be particularly comprehensive, and prepared with great care. Mr. HARTLEY's pamphlet begins with descriptions and analyses of Pictou coals. In this chapter several analyses which have been published in various papers and reports, now out of print and inaccessible to the public, are reproduced, as well as a number of original researches by the author, now for the first time published.

The method of conducting these analyses is also given, so that a practical chemist can form a very fair idea of the care exercised, and of the value of the results obtained. The theory and method of calculating the positive and comparative thermal effects of various coals are clearly stated, and at the same time the value of practical trials, such as heating and smelting iron, is fully recognized. The analyses show a remarkable freedom from sulphur, the presence of which often unfits a coal for purposes to which it is otherwise particularly adapted.

The author states that the greater part of the coals from this region are entirely free from sulphur in combination with iron, and the ashes of but very few show an appreciable amount of sulphate of lime. The second chapter contains a number of practical tests of coals from different mines, made on steamers, locomotives, and in the manufacture of illuminating gas. Comparisons with other well-known coals, and also with wood for locomotive use, are given and possess value to those who are acquainted practically with the value of the standards. The third chapter relates to the iron ores of the county. The examination of the iron districts being merely incidental to the coal survey, but little is shown besides the existence of various ores of iron, and only a few localities were visited and examined.

Specular ore is said to exist in true fissure veins, but of no considerable size, in any locality visited by the author. Limonite or brown hematite appears to be much more abundant. "In one place a shallow pit sunk by one man in a few hours disclosed a pure mass, eight feet in thickness, of the mamillary, stalactitic and fibrous varieties."

A mixture of spathic ore and red hematite, with but little impurity, was found on the south bank of Sutherland's brook, but whether the deposit was a bed or a vein was not determined. Its thickness varied from eleven to fourteen feet when exposed. Clay-ironstone was also found, but not in workable amounts, though the author thinks that these seams may become valuable at a future day in connection with the other iron deposits of the region.

NOTES ON THE SPRINGHILL COAL FIELD. By the same author.

The coal from this region contains, on the average, less ash than the British or American coal with which it is compared, and is on this account, as well as its small percentage of sulphur, considered well adapted to iron smelting. The average Springhill coal contains 3.53 per cent. of ash and 0.225 per cent. of sulphur. The coal is compact and firm and resembles the Newcastle. Five coal seams discovered in this locality represent a total thickness of 32 feet 3 inches, the main seam which is more especially referred to in the pamphlet being 11 feet 3 inches in thickness. In another place we reprint Mr. HARTLEY'S GENERAL REMARKS ON STEAM-TRIALS.

PEAT FUEL: HOW TO MAKE IT AND HOW TO USE IT. By T. H. LEAVITT. Boston: LEA and SHEPHARD.

This neat little volume contains practical information of considerable value to those who want cheap fuel in regions where coal is scarce and peat easy to obtain. Hitherto our forests have supplied us so abundantly with wood, in localities remote from coal, that we have never paid much attention to the utilization of a fuel which is doubtless capable of supplying the place of either coal or wood for many purposes. The extensive use of peat in portions of Europe, particularly in parts of Ireland where "turf" is used almost to the exclusion of every other kind of fuel, is too well known to need further comment. In many instances the peat, merely cut and dried, is used directly as fuel, but there is no doubt that in many cases a more elaborate treatment, as recommended by Mr. LEAVITT, will yield favorable economical results. An Irish doctor, writing in 1685, says: "Turf charred, I reckon the sweetest and wholesomest fire that can be; fitter for a chamber and for consumptive people than either wood, stone coal or charcoal."

Theoretical Comparison of the Different Furnaces Employed for the Remelting of Pig Iron.

By Dr. E. F. DÜRRE, Berlin.

THE author of this paper intends to treat the above subject more fully in the second volume of his work on "iron casting," but in order to stimulate researches in this connection in those branches of metallurgy most specially devoted to iron casting, he has also published the following in our able cotemporary, the *Berg-und Hüttenmaennische Zeitung:*

The progress in the construction of appropriate apparatus for the better utilization of the heat in the different processes connected with metallurgy and technology, has given rise to many theoretical explanations, and it seems therefore necessary to present the results of these researches to our practical brethren, in order to induce them to make experiments and reforms.

At the same time, a guide for the independent examination of practical results will thereby be given, without encroaching upon the distaste for the publication of working results.

In doing so, however, it is necessary to avoid everything embarrassing the practical engineer in working with the main results of the teachings of calorics, and also, to establish always the relations to results in practice, and to elucidate important differences, wherever they exist. The fact that several excellent treatises published of late have not had the effect they ought to have produced, can only be ascribed to their one-sidedness in this connection. The author of this sketch considers the same only as an attempt to reduce the working results, reached by different means, and deviating from each other so greatly, to certain normals, and he hopes that, in another place, he will be able to prove his views more fully.

1. CALCULATION AND PROOF OF THE VARIOUS PHENOMENA IN COMBUSTION AND MELTING.

An approximate calculation of the temperature in the melting and casting of pig iron based on caloric theorems and experiences is first in order.

1 lb. of pig-iron requires a heat quantum of W = w.g.t units, in which

w = the coefficient of specific heat for pig-iron at a melting temperature;
t = the melting temperature in degrees centigrade;
q = the quantity of pig-iron—in this case 1 lb.;
w = is given by WEISBACH, as 0.1298;
" " SCHINZ, as 0.131487 for a temperature of 1175°.

The temperature of the cupola furnaces is, however, higher than 1175°, and is likely to reach 1500°.

At 1500° w is, according to SCHINZ, 0.146484, and thus W is found = 0.146484×1500×1=220 units of heat.

If the results in practice are compared with this, i. e., if from the average consumption of fuel in the different kinds of furnaces employed in practice, the production of heat is calculated, the economical and technical value of the various apparatus is at once found.

The fuel employed in most cases is either coke or stone coal. The process of combustion of these two is not always the same, but is in general dependent on the following circumstances:

a. Size of contact-surface, which is offered by the fuel to a certain volume of air or oxygen in the unit of time.

b. Height of the temperature in the space where combustion takes place.

c. Purity and dryness of the air supporting combustion.

d. Pressure. i. e., tension, under which combustion takes place.

The produced quantum of heat is :

a. 8,000 units of heat from the combustion of one part (in weight) of C to CO_2.

b. 2,400 units of heat in the formation of CO. Free hydrogen forms H_2O at a sufficient temperature, and produces 34,000 units of heat.

If the temperature is insufficient, or if other circumstances prevent perfect combustion, hydro-carbons are formed.

The intensity of heat, i. e., the technically available effect is besides dependent on other circumstances. Among them the following must be principally noticed :

a. Dilution of the products of combustion by incombustibles, as, for instance, nitrogen and steam.

b. The really produced quantity of heat.

c. Tension in the melting space.

Under this head the following must principally be noticed :

a. The attenuation of the products of combustion depends on the perfection of the combustion. Under this head belong first the experiments by SCHINZ on the perfection of combustion, which have given the following interesting results :

An influx of air of 0.39 metres velocity per square metre of contact surface, is the most favorable, because only carbonic acid can then be formed. In the products of combustion neither oxygen nor combustible gases are present.

An influx of air of 0.09 metre velocity per square metres of contact surface causes the formation of CO exclusively.

In SCHINZ's experiments, for the sake of simplicity, only the surface of the fuel-fragments had been introduced in the calculation, for coke being a porous material, possesses undoubtedly a much larger contact surface than stone coal, and for this reason must be burned with a much stronger draught.

Anthracite, for instance, shows, with the same influx of air, a much larger surplus of the same in the products of combustion.

The size of the pieces has, of course, very much influence on this proportion. According to the calculations of SCHINZ, the total surface per ton, 7 1-9 cubic feet, are with pieces of

3 inches,	4 inches,	5 inches and	6 inches ;
8,785	6,598	6,015	4,407 sq. metres.

The velocity of the inflowing air must therefore vary also, to produce equal results.

b. The really produced heat-quantum depends on the chemical nature of the product of combustion. The proportions of the carbonic acid, carbonic oxide, and often also of the water, determine the amount of heat developed by the hearth. It also depends on the perfection of combustion already spoken of, i. e., the influx of air in proportion to sum of surface of the fuel-fragments in the space of combustion. Besides this—and this is a practical consequence of habitual furnace-constructions and working principles—the height of the stratum of fuel in the furnace, i. e., the proportion to the size of the surface covered by it, has some influence. The hearth of a reverberatory of twenty-five to thirty square feet surface, covered with coal fifteen inches high, furnishes a mixture of gases different from that of a furnace-shaft of four to five feet square, and filled with a column of coal six to eight feet high, unless the influx of air in the latter case takes place at an enormous velocity, in order to prevent the continual reduction of the CO_2 formed in the lowest zone, to CO, and to introduce the O necessary for the combustion of the equivalent amount of coal to CO^2.

c. The tension in the smelting space depends on the proportion of the size of the apertures through which the produced gases are emitted, to that of the space for the influx of fresh air. It is in direct proportion to the tension of the latter, so that the flues of the furnaces can be made smaller, the greater the tension of the air entering the furnace. The tension in the furnace must, of course, be always somewhat different, inasmuch as the air entering the furnace is increased in volume by the gasification of the carbon, which will have the more obstructing influence on the influx of air, the smaller the flues are in proportion to the sections of the apertures admitting the air. For this reason, it is necessary, in order to keep the pressure in the furnace nearly a constant one, to impart to the incoming air a greater velocity than to the escaping gases.

Lately, the effect of a pressure in the furnace on the temperature has become very apparent by the experimental pressure-furnaces of BESSEMER. He has constructed cupola-furnaces with closed tuyeres and funnel heads ; reverberatories with variable size of flues : and converters with movable conical valves in the mouth, in order to enable him to execute particularly hard work, as, for instance, the operation of melting together wrought iron and steel, wrought iron scraps, and pig iron, etc. The erection of such apparatus is, of course, very costly, and requires, first of all, a very strong blast, which produces not only a pressure as high as it is used in the converter, but even a much higher one.

2. COMPARISON OF THE THEORETICAL AND PRACTICAL CONSUMPTION OF FUEL.

In crucible furnaces.—100 lbs. of crucible casting requires in the most favorable case, when crucibles holding 100 kilogrammes iron are used, 80 lbs. of coke with 64 lbs. carbon, if coke contains as presumed 80 per cent. of carbon. If we suppose, that all the carbon is burned to CO only,

153,600 = (64×2,400) units of heat, instead of
22,000 theoretically requisite for 100 lbs. pig-iron are consumed.
131,600 units of heat are consequently lost, mainly by conduction.

The losses by conduction are not easily calculated, and can hardly be diminished if a chimney-draft is used.

In shaft furnaces.—In this connection we must discuss several examples :

(a.) 100 lbs. cast-iron from a small cupola-furnace, worked with two tuyeres, slightly heated blast and comparatively high pressure for the production of small castings (product 1,500 to 2,000 lbs. per hour), consumed 4,473 lbs. of coke. The coke made from small bituminous coal and dust was very irregular in its contents of carbon, and the effective amount of the same cannot be assumed higher than 60 per cent. ; 100 lbs. of cast-iron would therefore have required only 26.84 lbs. of carbon, which, owing to the height and narrowness of the furnace-shaft, ought to have developed very little CO_2 ; only when the working had reached the highest capacity, i. e., when the charge had gradually been raised from 200 to 400 or 500 lbs., the proportion 1:1, adopted by SCHINZ, for the quantities of fuel changed into CO and CO_2 in shaft-furnaces, could be assumed. But if we include in the calculation the filling material, which is generally burned to carbonic oxide only, a proportion of 5:1 for the formation of CO and CO_2 can hardly be established; 22.37 lbs. were therefore burnt to CO, and 4.47 lbs. to CO_2 and these produce :

22.37×2400 = 53,688 units of heat, and
4.47×8000 = 35,760 " "
Together, 89,448 " "
22, 00 as theoretically necessary for 100 lbs. pig-iron.
67,448 units are therefore lost in the chimney gases and by conduction through the furnace walls, wich became sometimes very hot.

The necessity of tapping only small quantities is also injurious to economical running, as the same furnace could very well melt down 4,000 lbs. per hour when ever greater quantities were wanted for large castings.

(b.) 100 lbs. of cast-iron from one of IRELAND's furnaces, of middling size for machine-castings, (45—5200 lbs. per hour), require 13½ lbs. coke (a 80 per cent. carbon) with 10.8 lbs. carbon. If we assume with SCHINZ, that one-half of the carbon burns to CO, the other half to CO_2, we consume

5.4×2,400 = 12,960 heat units, and
5.4×8,000 = 43,200 " "
Together, 56,160 " " instead of
22,000 as theoretically required for 100 lbs. pig-iron.
34,160 heat units are therefore lost by conduction and radiation.

When melting for large castings, so that the operation is more continuous, the consumption is lessened to 6-7 lbs. coke per 100 lbs. pig iron, the same result as IRELAND himself has succeeded in reaching with his large furnace at Bolton.

(c.) 100 lbs. of cast-iron from a KRIGAR cupola-furnace for machine-castings (4,000—5,000 lbs. per hour), require 10 lbs. of good Westphalian coke and an abundant blast of small pressure to produce a perfectly overheated iron. In spite of the feeble pressure the peculiar way, by which the blast enters, facilitates an abundant formation of CO_2 and the circumstances assumed under *b* can be accepted also for this case. Therefore

4×2,400 = 9,600 H. U., and
4×8,000 = 32,000 H. U.
Together, 41,600 H U. are produced, instead of
22,000 as theoretically required for 100 lbs. pig-iron.
19,600 H. U. are therefore lost by conduction and radiation.

It is unnecessary to multiply examples. The few here brought forward suffice to show the unsatisfactory proportions of the theoretical and real effect, and at the same time point out the way for improvements. These can be brought about by an increase of the production of CO_2, i. e., by a lessening of the coal charges and an increase of blast, combined with rapid charges and frequent tapping of the melted iron below. The furnaces of IRELAND, KRIGAR, MACKENZIE, WOODWARD, HINTON and others, try to reach the same results by different ways, and each one must be acknowledged as a noteworthy improvement in practice.

In reverberatories.—100 lbs. of cast iron from a French Staffordshire furnace required, according to GUETTIN, 49 lbs. of stone coal from Mons. Adopting the composition of the coal as 0.78 C, 0.04 HO, and 0.18 ashes, we have as fuel :

38.22 lbs. carbon,
1.96 lbs. hydrogen.

If we assume, that with good stirring, nearly all the carbon is changed to CO_2 and all the hydrogen to HO,

38,22× 8,000 = 305,760 H. U.
1,96×34,009 = 66,640 H. U.
Together, 372,400 H. U., instead of
22,000 are produced.
350,400 H. U. are therefore lost by conduction and radiation.

On account of the great surface of the reverberatory mantle the loss by radiation is greater than that by conduction, especially when the heat of the waste gases is used for warming the charge up to a certain temperature before it is inserted into the furnace. The losses by radiation of a reverberatory can be calculated by using DULONG's law (the transmission is proportional to the square of the temperatures of the transmitting surfaces,) and SHINZ's results (36046 heat units per square meter and hour at 540° Celsius,) as a basis, as follows :

$$540^2 : 1500^2 :: 36046 : X$$

X=281216 heat units pro square meter and hour, and consequently the loss of heat in a reverberatory of 17½ square meters surface is 4,850,976 heat units per hour, when the furnace is heated to 1500°. If we presume further, that this furnace could hold 100 cwt. (10,000 lbs.) of iron, the entire loss of heat would be 350,400X100=35,040,000 heat units. Such a quantity of iron requires about seven hours to melt down, and reaches only during the last hour the full smelting temperature. Consequently the furnace walls can radiate only during the last hour the 4,850,976 heat units as calculated above. The previous losses by radiation can be approximately calculated, by introducing into the proportion

$$4,850,977 : (1500°) = X : (t)^2$$

instead of t, the average temperature increased regularly for the sake of simplicity ; thus :

t = 132 for the first ;
= 375 for the second ;
= 625 for the third ;
= 875 for the fourth ;
=1125 for the fifth ;
=1375 for the sixth working hour of furnace.

It would lead me too far to make the full calculation here, and it sufficient to point out the magnitude of the injurious influences which limit the affectiveness of our technical apparatus and augments the cost of labor. The remaining losses may be considered caused by the conduction and absorption of the walls.

Still more exactly the sum of the losses by radiation may be calculated between the limits 14°=O and 1500°=4,850,976 as the sum of an exponential series. Here, it was only my object to show the unfavorable proportion between the effect of fuel and the practical effect required.

The foregoing results, without showing absolute exactness and conclusiveness, have certainly proved that even a simple technical process, like the smelting of cast-iron, is exposed to hardly less obstructions and unfavorable influences, than the most extended and complicated. And on account of this, it is undoubtedly important to commence the necessary caloric experiments and calculations with such apparatus as the remelting furnaces of foundries, and thus to acquire a basis for the consideration of furnaces in general.

Australian Mineral Oil.

THE discovery of large deposits of shale near Sydney in New South Wales, has been followed by the recent erection of extensive works for distilling the oil, and a good commercial success seems likely to attend this somewhat spirited enterprise on the part of the colonists. The mineral deposits are about eighty miles from Sydney, near ths western slope of the Blue Mountains, on the Great Western railway. From the railway a horse tramway has been built, principally in side cutting, and for the most part following the contour of the mountain spur, and leads upwards for a distance of a mile and a quarter, terminating in a high ridge, five hundred feet above the mouth of the main shaft of the workings and the engine-house. An incline, with a ruling slope of one to two, connects the workings with the summit level, to which the mineral is hauled by a stationary fourteen horse-power engine, driving a Fowler's clip-drum, six feet in diameter. The same engine also lifts the shale to the surface, and does what small pumping duty is required.

The shaft of the mine is only forty feet in depth, and from the bottom is driven a heading with drifts to the right and left, the walls of which are like asphalte. How this rich oil-bearing deposit found its way between the sandstone stratification of this locality, does not appear, but on close examination extensive crevices will be found filled with soft pipe-clay, clearly indicating that the entire mass must at one period have been in a fluid state, which, in cooling, must have contracted, producing the fissures alluded to. The thickness of the seam is about five feet six inches—in some places as much as six feet. The dip of the strata is about one in thirty-six towards the north-east. The mine is now capable of being worked so that almost any quantity of shale could be got out. At present, about one hundred tons per week are forwarded by tram and rail to Sydney, to supply the refining works at Waterloo. Before the completion of the tram, the cartage of the mineral by road to the railway cost 14s. to 15s. per ton, whereas the present cost by tram is 1s. 6d. per ton.

The works at Waterloo are worth a visit, and are thoroughly well designed. The kerosene shale is brought by rail to the Sydney terminus of the Southern and Western railway, and is then carted to the works, situated on the Botany road. It is here put through the different processes for the production of crude, and afterwards refined oil, for illuminating, lubricating, and other purposes. The first process is that of retorting, which is performed by a bench of sixty retorts, each of which has a capacity for nearly five hundred weight of mineral packed away in blocks, some nine or ten inches square, the smaller pieces being thrown in upon the top to fill up the interstices ; the doors of the retort are then luted and screwed into place, and the process of distillation is at once commenced. The vapor is produced by the heat of the furnaces, and condensed by passing it through a condensing-pipe, placed in a trough of water, and afterwards through an atmospheric condenser, consisting of vertical pipes, six inches in diameter. The condensed or crude oil is collected in a large tank, ready for pumping to the crude oil still, which duty is performed by a small steam-pump, driven by the steam-boiler used for supplying steam to the retorts.

The oil being pumped up to a tank elevated on a small round tower, the crude oil stills, five in number, can easily be charged. This operation performed, it passes through large horizontal condensers, filled with a multitude of small pipes for the condensing water. The once-run oil, as it is now called, is collected in a tank, containing 5,000 gallons, and is ready for the refinery, where it is treated with the acids and alkalies required. The process of refining is simple, but needs considerable judgment.

The refinery-house is forty-eight feet by sixty-four feet, and down the centre is arranged the shafting and pulleys for working six centrifrugal pumps, and the acid and soda agitators. The acid agitators, four in number, are arranged on the southern side of the building, and elevated about eight feet above the floor. Under each agitator, which is of cast-iron, are two cast-iron settling tanks of the same dimensions. The oil having been treated with the acid, and allowed to settle, is pumped up into the soda agitators, and subjected to a similar process. The agitators are for bringing every particle of oil in contact with the acid, for the purpose of destroying any organic particles it may contain. These processes are repeated until the oil is brought up to the requisite degree of purity, when it undergoes the final distillation. The whole of the machinery in this department, including the water-pump for supplying the service tank on the top of the building, is driven by a horizontal steam engine, of sixteen horse-power. The capacity of the refinery is equal to 20,000 gallons of oil per week, which can be finished by one man and a boy ; in fact, the success of the

establishment appears to be due to the care that has been taken in every branch to make machinery take the place of manual labor.

The oil now passes to the fine-oil stills, each of which contains 4,000 gallons, and is capable of running over 2,000 gallons per day. The steam engine and pumps are supplied from two Cornish boilers, partially heated by the combustion of the waste uncondensable gas from the retorts. The chimney or shaft into which the whole of the flues converge, is a fine structure, one hundred and four feet high, six feet internal diameter at the base, and five feet six inches at the top. The refined oil appears all that can be wished; it is quite clear, and bears an excellent character for its illuminating power and safety. Its specific gravity is 0.800° at 60° Fahrenheit, and the flaming point is 120° Fahrenheit, which is considerably above the imported oil. The price at which it is being manufactured leaves a very large margin for profit. So great is the demand for the oil, that it is the intention of the company to double the number of retorts at an early day. There are at present two store stock tanks, of a capacity of 25,000 gallons each, from which pipes lead into the packing-room, where the casks and tins are filled and branded ready for the market.—*Engineering.*

OFFICIAL LIST OF PATENTS.

Issued by the United States Patent Office.

FOR THE WEEK ENDING JULY 26, 1870.

Reported Officially for the Engineering and Mining Journal.

SCHEDULE OF PATENT OFFICE FEES

On each caveat	$10
On filing each application for a Patent (seventeen years)	15
On issuing each original Patent	20
On appeal to Commissioner of Patents	20
On application for Reissue	30
On application for Extension of Patent	50
On granting the Extension	50
On filing a Disclaimer	10
On an application for Design (three and a half years)	10
On an application for Design (seven years)	10
On an application for Design (fourteen years)	30

In addition to which there are some small revenue stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

For copy of Claim of any Patent issued within 30 years $1

A sketch from the model or drawing, relating to such portion of a machine as the Claim covers, from upward, but usually at the price above named $1

The full Specifications of any patent issued since Nov. 20, 1866, at which time the Patent Office commenced printing them $1 25

Official Copies of Drawings of any patent issued since 1836, we can supply at a reasonable cost the price depending upon the amount of labor involved and the number of views.

Full information, as to price of drawings, in each case may be had by addressing

WESTERN & CO.,
No. 37 Park Row, New York.
CHARLES ROGERS, Solicitor.

105,619.—PAPER FRUIT-BASKET.—Alfred Adams, Chagrin Falls, and Joseph F. Jewett, Cincinnati, Ohio.

105,620.—CIGAR-MACHINE.—Julian Allen and John Fanning, Brooklyn, N. Y., assignors to the American Cigar-Machine Company, New York city.

105,621.—SEED-PLANTER.—Prudden Alling, Norwalk, Ohio.

105,622.—APPARATUS FOR REDUCING WOOD TO PULP.—Gustavus Ames, New York, N. Y., assignor to himself and William H. Cilley, Northfield, N. H.

105,623.—ADJUSTABLE DOOR-SILL.—Maurice Armstrong, Girard, Illinois.

105,624.—CHIMNEY-COWL.—Christian W. Bache, Philadel., Pa.

105,625.—TELEGRAPH-INSULATOR.—William W. Baldwin, Cleveland, Ohio.

105,626.—antedated July 19, 1870.—STEAM-GENERATOR.—Nelson H. Barbour, New York, N. Y.

105,627.—MACHINERY FOR CUTTING WAX INTO SHEETS.—William F. Barnes, Rockford, Ill., assignor to himself and Susan H. Clark, same place.

105,628.—NEEDLE-THREADER.—Nelson Barnum, La Porte, Ind.

105,629.—PRUNING-SHEARS.—Henry W. Black, Cecilton, Md., assignor to himself and Evan T. Evans, Middletown, Del.

105,630.—SULKY-CULTIVATOR.—Noah G. Blauser, Etna, Ohio.

105,631, antedated July 19, 1870.—SEWING-MACHINE.—Thomas Biet her, London, England, assignor to himself and William Riddell, same place.

105,632.—POWER-PRESS.—Eliphalet W. Bliss, Brooklyn, N. Y., assignor to Mays, Bliss & Co., same place.

105,633.—CUTTING ASHLARS.—William Boulton, Tompkinsville, Staten Island, N. Y.

105,634, antedated June 9, 1870.—COMPOUND FOR MANUFACTURE OF PAINTS.—Amos H. Bourne, Fort Scott, Kansas.

105,635.—RAILWAY CAR STARTER.—Charles B. Broadwell, New Orleans, La.

105,636, antedated July 14, 1870.—SPRING BED-BOTTOM.—Mortimer Cahill, Kalamazoo, Mich.

105,637.—DESIGN-DIE FOR ORNAMENTING.—Benjamin F. Calley, Saugus, Mass.

105,638.—GAUGE FOR PRINTING-PRESSES.—Andrew Campbell, Brooklyn, N. Y.

105,639.—SHEEP-SHEARS.—Daniel Campbell, Elizabeth, N. J., assignor to Henry Seymour & Co., New York City.

105,640.—STEAM HEATER.—Benjamin F. Campbell and Charles Whittier, Boston, Mass.

105,641.—RECEPTACLE FOR MEASURING OUT SHOT.—Ezra C. Carleton, Port Huron, Mich., assignor to William Stewart & Co., same place.

105,642.—STEAM-GENERATOR.—John Carroll, Detroit, Mich.

105,643.—HULLING-MACHINE.—Joseph Eleazer Carver, Bridgewater, Mass., assignor to Henry T. Pratt and John C. Alden, same place.

105,644.—LAMP.—David Challinor, Birmingham, Pa.

105,645.—TOY MONEY-BOX.—John H. Campbell, Brooklyn, N. Y.

105,646.—WASHING-MACHINE.—William B. Cheeseman, Winona, Minnesota.

105,647.—SAWING-MACHINE.—Moses Neal Clark, Harrison City, Pennsylvania.

105,648.—WATER-PROOF CEMENT.—Thomas S. Clark, Charlestown, Mass.

105,649, antedated July 15, 1870.—SAD-IRON.—John Conner, Richmond, Ind.

105,650.—WASHING-MACHINE.—Emanuel Cool and Sabisea Cool, Buckhannan, West Va.

105,651.—REIN-HOLDER.—William H. Cooper, Glover, Vt.

105,652.—CHURN.—William H. Curtin, Clement, and William Lammers, Breese, Ill.

105,653.—RELAY-MAGNET.—Ludovic Charles Adrien Joseph Guyot D'Arlincourt, Paris, France.

105,654.—ADJUSTABLE REEL-POST FOR HARVESTERS.—Joseph Watts Davis, Dublin, Ohio.

105,655.—EGG-BEATER.—Gilbert K. Dearborn, Pawtucket, assignor to Timothy Earle, Smithfield, R. I.

105,656.—CRAMP-HOOK FOR TELEGRAPHIC WIRE INSULATORS.—Wm. H. Dechant, Philadelphia, Pa., assignor to David Brooks, same place.

105,657.—PLANING AND MOLDING MACHINE.—Frank Douglas, Norwich, Conn.

105,658.—WOOD PAVEMENT.—Henry Dowson, Springfield, Ill.

105,659.—MACHINE FOR CRUSHING MINERAL AND OTHER HARD SUBSTANCES.—David C. Ebaugh, Charleston, S. C.

105,660.—DEVICE FOR PREVENTING PLOWS FROM CHOKING.—William M. Eckles, St. Louis, Mo.

105,661.—CARPET "UNDERLIE."—Nelson Edwards, Jericho, Vt.

105,662.—FARM-GATE.—George J. Fielder, Danby, Ill.

105,663.—ELECTRO-MAGNETIC MOTOR.—Louis Finger, Cambridge, Mass.

105,664.—ELECTRO-MAGNETIC APPARATUS FOR MOVING PANORAMAS.—Louis Finger, Cambridge, Mass.

105,665, antedated January 26, 1870.—MOVABLE SCREEN FOR PHOTOGRAPHERS.—Eliphalet J. Foss, Cambridge, Mass.

105,666.—DEPURATOR.—Samuel C. Frink, Indianapolis, Ind.

105,667.—FLOUR-SIFTER.—George Gessert, Edwardsville, Ill.

105,668.—MACHINE FOR ROLLING PLOW-BEAMS.—William Gilman, Ottawa, Ill.

105,669.—VAPOR BURNER.—Lyman A. Gouch, Yonkers, N. Y.

105,670.—MANUFACTURE OF SOAP.—Louis Groux, New York, N.Y.

105,671.—BOOT-JACK AND SPUR.—Timothy Gunn, Hamilton county, Ind.

105,672.—COAL-STOVE.—Joseph Hackett, Louisville, Ky.

105,673.—PLOW.—Joseph D. Hall, Canton, Ohio, assignor to William Kingsworth, same place.

105,674.—WAGON-HUB.—John D. Ham, Bethany, Ga., assignor to himself, Eli McCroan, and W. A. Wilkins, same place.

105,675.—BOLT.—Mathew Harbster, Reading, Pa., assignor to Harbster Brothers & Co., same place.

105,676.—SCHOOL-SEAT.—Charles G. Harrington and David Mills, Northville, Mich.

105,677.—CHAIR AND LOUNGE.—Milton P. Harley, Philadel., Pa.

105,678.—OVEN OR STOVE FOR HEATING THE BLAST OF BLAST FURNACES.—John M. Hartman, Philadelphia, Pa., assignor to George W. Whitaker.

105,679.—MODE OF ATTACHING HOLD-BACK RINGS TO HAMES.—William B. Hayden, Columbus, Ohio.

105,680.—HORSE-POWER.—John R. Hedges, Glenwood, assignor to himself and Valentine & Sparks, Buffalo, N. Y.

105,681.—CIGAR-BOX.—Eugen Henkel, North Scituate, R. I.

105,682.—WINDLASS.—Alonzo Hitchcock, New York, N. Y.

105,683.—OIL-STILL.—John Hofferberth, Baltimore, Md.

105,684.—DUMPING-WAGON.—Britain Holmes, Buffalo, N. Y.

105,685.—STEAM-GAUGE.—John P. Holt, Cleveland, Ohio.

105,686.—MITERING-MACHINE.—John Holzberger, Newark, N.J.

105,687.—GLOVE.—Daniel S. Hulett, Gloversville, N. Y.

105,688.—APPARATUS FOR REMOVING OIL FROM SEEDS, MEAL, &c.—Elias S. Hutchinson, Baltimore, Md.

105,689.—RAILROAD-CAR JOURNAL-BOX.—Charles Ihrig, Jersey City, N. J.

105,690.—GRAIN-DRILLING MACHINE.—Joseph Ingels, Milton, Indiana.

105,691.—PADLOCK.—Joseph Ingels, Milton, Ind.

105,692, antedated July 11, 1870.—LAMBREQUIN.—Henry M. Johnston, New York, N. Y.

105,693, antedated July 11, 1870.—LAMBREQUIN.—Henry M. Johnston, New York, N. Y.

105,694.—WATER-WHEEL.—George H. Jones, Rose, N. Y.

105,695.—BOXING FOR COVERING THE SHAFTING OF MACHINERY.—Marquis R. Jones, Darien, Wis.

105,696.—UNIVERSAL SHAFT-COUPLING.—Moses A. Keller, Littlestown, Pa.

105,697.—COMPOUND SWITCH FOR ELECTRIC BATTERIES.—Jerome Kidder, New York, N. Y.

105,698.—WATER-WHEEL.—Alfred Kneass, Northumberland, Pa.

105,699.—METALLIC RAILWAY CAR.—Bernard J. La Mothe, New York, N. Y.

105,700.—TRACE-SUPPORTING STUD.—Josiah Letchworth, Buffalo, N. Y.

105,701.—COMBINED HOBBY-HORSE AND CARRIAGE-MOTOR.—John Liming, Philadelphia, Pa.

105,702.—CORN-PLANTER.—William H. Littel, Prairie du Chien, Wisconsin.

105,703.—CORN AND SEED-PLANTER.—Wilber C. Lockwood, Spring Mills, Mich.

105,704.—CROSS-CUT SAW.—Peter Longwell, Poplar, Ohio.

105,705.—DEVICE FOR PREVENTING THE UNCOUPLING OF CLUTCHES IN SPINNING-MULES.—Hezekiah Macon and Joshua Hunt, Providence, R. I.

105,706.—CAR-COUPLING.—Malancthon B. Malott, Richmond, Indiana.

105,707.—WOOD PAVEMENT.—Duncan McKenzie, Brooklyn, N.Y.

105,708.—ROTARY ENGINE.—Edwin D. Mead, Shortsville, N. Y.

105,709.—GRAIN-DRIER.—Robert Milburn and Thomas Browning, No. 76 Church Lane, Whitechapel, Great Britain.

105,710, antedated July 22, 1870.—PADLOCK.—Daniel K. Miller, Reading, Pa

105,711.—GRINDER FOR CLEANING CASTINGS.—George Miller, Providence, R. I.

105,712.—WATER-WHEEL.—George Miller, Providence, R. I.

105,713.—TAP-NOZZLE FOR CANS.—Herman Miller, New York, N.Y.

105,714.—METALLIC STANDARD FOR WAGON-BOXES.—Edward Milner, Marquette, Mich.

105,715.—ATTACHMENT FOR SEWING-MACHINE.—Schamu Moritz Moschcowitz, New York, N. Y.

105,716.—CORN-HARVESTER.—Nelson Newman, Springfield, Ill.

105,717.—ADDING-MACHINE.—Nels Ockerlund, New York, N. Y.

105,718.—REED MUSICAL INSTRUMENT.—Isaac T. Packard, Chicago, Ill.

105,719, antedated July 18, 1870.—PLANKING-SET.—Eliphalet H. Parker, Bucksport, Me.

105,720.—TREATING AND PRESERVING GRAIN IN BULK.—Charles F. Parrott, New York, N. Y., assignor to himself and John F. Kohler, same place.

105,721.—TABLET LOCKET FOR PHOTOGRAHS, &c.—Gurdon W. Pitcher, Brooklyn, N. Y.

105,722.—HORSE HAY-FORK.—Henry G. Porter, Grand Rapids, Mich.

105,723.—HAY-CARRIER.—Thomas J. Powell, Naples, N. Y., assignor to George Smith, Providence, R. I., and John C. De Lang, Detroit, Mich.

105,724.—HORSE-POWER.—Robert Quinn, Whitefield, Miss.

105,725.—FLOATING TIDE-DOCK.—William Rickard, Jersey City, N. J., assignor to himself and E. K. Meigs, same place.

105,726.—MUSIC LEAF-TURNER.—Edward B. Robinson, Portland, Maine.

105,727.—MATCH-STICK.—John K. Robinson, Middlebury, Ohio.

105,728.—ENGINE FOR SEPARATING FIBER FROM HUSKS OF COTTON-SEED.—Thomas Rose and Robert Emerson Gibson, Earlstown, England.

105,729.—PROCESS FOR SEPARATING THE FIBER FROM THE HUSK IN COTTON-COATED SEEDS.—Thomas Rose and Robert Emerson Gibson, Earlstown, England.

105,730, antedated July 14, 1870.—LIFE-PRESERVING SKIRT.—Sarah E. Saul, Brooklyn, N. Y.

105,731.—TABLE-CASTER.—Daniel Sherwood, Edward P. Woods, and George D. Dudley, Lowell, Mass., assignors to Woods, Sherwood & Co., same place.

105,732.—TABLE-CASTER.—Daniel Sherwood and George D. Dudley, Lowell, Mass., assignors to Woods, Sherword & Co., same place.

105,733.—HORSE HAY RAKE.—Alexander J. Shunk, Des Moines, Iowa.

105,734.—SIDE-SADDLE.—Fenwick Smith, Austin, Texas.

105,735.—AUTOMATIC GATE.—Pratt A. Spicer and Montgomery Crossman, Marshall, Mich.

105,736, antedated July 22, 1870.—RIFLED CANNON.—Alban C. Stimers, Castleton, N. Y.

105,737, antedated July, 1870.—HEATING-STOVE.—Carl Lister Svenson, Topeka, Kansas, assignor to J. Q. C. Searle, same place.

105,738.—HEATING-FURNACE.—Wm. A. Sweet, Syracuse, N. Y.

105,739.—VELOCIPEDE.—Ephraim Tarbox, Charlestown, Mass.

105,740.—FARMER'S BOILER.—Richard W. Thickins, Batavia, Ill., assignor to David R. Sperry.

105,741.—SEWING-MACHINE.—Cyrus B. True, Boston, Mass.

105,742.—DISH-WASHING MACHINE.—Sophia S. Tupper, Churchville, N. Y.

105,743.—HINGE.—Samuel D. Van Pelt, Anderson, Ind.

105,744.—HOLLOW AUGER.—Isaac H. Van Wie, Clarksville, N.Y.

105,745.—CULTIVATOR.—Charles L. Waffle, Sharon Centre, Ohio.

105,746.—COOKING-STOVE.—Benjamin F. Warren, Fishkill, N. Y.

105,747.—FURNACE FOR REBURNING BONE-BLACK AND REDUCING ORES.—Adam Weber, New York, N. Y.

105,748.—STOVE-LEG.—Frank Whalen, Ballston Spa, N. Y.

105,749.—LAND-ROLLER.—Elisha Whitcomb and Daniel A. Guen, Waterville, Ohio.

105,750, antedated July 11, 1870.—LUBRICATOR.—John B. Wickersham, Philadelphia, Pa.

105,751.—CHURN.—Milton Jones Wikoff, Stout's Post-office, Ohio.

105,752.—MITER-BOX.—Edward M. Wilcox, Bloomer, Wis.

105,753.—SAFETY GUARD FOR RAILWAY CARS.—John Atwater Wilkinson, Wilson, N, Y.

105,754, patented in England February 22, 1869.—RAILWAY CROSSING.—Richard Price Williams, Great George street, Westminster, England.

105,755.—METALLIC PLATE-SCREEN FOR SCREENING PAPER PULP.—Arthur St. Clair Winchester, Boston, Mass., assignor to himself and James Seton Parsons, same place.

105,756.—GAS APPARATUS FOR RAILROAD CARS, &c.—Joseph S. Wood, Philadelphia, Pa., assignor to himself and John J. Carberry, same place.

105,757.—GAS APPARATUS FOR RAILROAD CARS, &c.—Joseph S. Wood, Philadelphia, Pa., assignor to himself and John J. Carberry, same place.

105,758.—FOLDING BUGGY-SEAT.—Thomas H. Wood, New York, N. Y.

105,759.—PREPARING RAWHIDE FOR USE IN CHAIR-SEATS.—Benjamin F. Wright, Charlestown, and John Rowe, Jr., Wilmington, Mass., assignors of three-fifths of their right to Seth H. Woodbury, William T. Gray, and Charles H. Drew.

105,760.—BORING AND MORTISING MACHINE.—Simeon M. Wright, Athens, Ohio.

105,761.—FOLDING COUNTER-STOOL.—John L. Young, New York, N. Y.

105,762.—LANTERN.—McClintock Young, Frederick, Md.

105,763.—REFRIGERATOR.—Ignazio Allegretti, Philadelphia, Pa.

105,764.—VENT FOR CASKS.—William Ascough, Buffalo, N. Y.

105,765.—TRAVELING BELT-STOP FOR MACHINERY.—Thomas Edwin Baden, Washington, D. C.

105,766.—BOX-SCRAPER.—Joseph R. Bailey, Woonsocket, R. I., assignor to himself and Selden A. Bailey, same place.

105,767.—BENCH-PLANE.—Joseph R. Bailey, Woonsocket, R. I., assignor to himself and Selden A. Bailey, same place

105,768.—GAS-BURNER.—John F. Barker, Springfield, Mass.

105,769.—APPARATUS FOR IMMERSING SHINGLES AND OTHER ARTICLES IN LIQUIDS.—Caleb Bates, Kingston, Mass.

105,770.—COMBINED HARROW AND SHOVEL CULTIVATOR.—Albert B. Baum, Grantville, Pa

105,771.—BEDSTEAD-FASTENING.—John Benjamin, Naples, N. Y.

105,772.—AUTOMATIC FAN.—Geo. H. Briggs, Montgomery, Ala.

105,773.—PLATFORM FOR STOVES.—Clark Brownell, Troy, N. Y.

105,774.—MACHINE FOR FLOCKING WALL-PAPER, SHOW-CARDS, &c.—Henry W. Bulkley, New York.

105,775.—HARROW.—Welcome J. Burdick, Alfred, N. Y., assignor to himself and Joel E. Morehesse

105,776.—LIQUOR PUMP.—Martin Cavanaugh, Philadelphia, Pa.

105,777.—SCISSOR-SHARPENING ATTACHMENT FOR SEWING-MACHINES.—George T. Chattaway, Brooklyn, N. Y

105,778.—SPOOL OF THREAD FOR SEWING-MACHINE SHUTTLES.—D. M. Church, Holyoke, Mass., assignor to himself and Timothy Merrick, same place.

105,779.—CULINARY VESSEL.—Emma Clark, Buffalo, N. Y.

105,780.—ORGAN, MELODEON, &c.—Hugh Archibald Clarke, Philadelphia, Pa.

105,781.—LAWN-MOWER.—Thomas Coldwell and George L. Chadborn, Newburg, N. Y.

105,782.—WATER CLOSET.—James M. Davis, Cincinnati, Ohio, assignor to himself and J. C. Grannon, same place

105,783.—ALCOHOL AND SPIRIT-STILL.—Joseph Dawson, Alexandria, Va.

105,784.—CORN-HARVESTER CUTTER.—John J. De Freitas, Springfield, Ill.

105,785.—CATAMENIAL SACK.—Warren A. Dinsmore, South Boston, Mass., assignor to himself and Emily L. Geer, same place.

105,786.—FURNACE FOR SALT-BOILING.—Willian James Dodge, Syracuse, N. Y.

105,787.—SASH-LOCKS.—George W. Dubuisson, Norwich, Conn.

105,788.—RECTIFYING WHISKY, &c.—Henry Fake, Brooklyn, assignor to himself and Charles A Todd, New York, N Y

105,789.—SEAT-FASTENING FOR CARRIAGES.—John H. Fellows, Alba, Pa.

105,790.—MANUFACTURE OF STRAW AND OTHER PAPER BOARD.—Benjamin F. Field, Beloit, Wis.

105,791.—RAILWAY-CAR COUPLING.—Jean C. Fisher and William E. Kittridge, Milwaukee, Wis.

105,792.—CHAMELEON WHIRLIGIG.—Ludwig Ottmar Franke, Baltimore, Md.

105,793.—CARRIAGE-AXLE.—Matthew R. Freeman, Macon, Ga.

105,794.—DISH-FASTENER.—Christian R. Freet, Upper Strasburg, Pa.

105,795.—ARGAND GAS-BURNER.—Jim B. Fuller, Norwich, Conn.

105,796.—ROTARY ENGINE.—William M. Fuller, New York, N. Y.

105,797.—BOTTLE-STOPPER.—Wm. H. Gibbs, Cincinnati, Ohio.

105,798.—BEDSTEAD-FASTENER.—Alexander Grillet, Philad., Pa.

105,799.—GUN-LOCK.—Lewis Hailer, Washington, D. C., assignor to William C. Dodge, same place.

105,800.—LOCK-SPINDLE.—Joseph L. Hall, Cincinnati, Ohio.

105,801.—CARRIAGE-AXLE.—William N. Hall, Springfield, Texas.

105,802.—MACHINE FOR SHARPENING REAPER-KNIVES.—Charles C. Hardy, Rutland, N. Y.

105,803.—EARTH-CLOSET.—George Baker Jewett, Salem, Mass.

105,804.—SAW-MILL.—Philip Jobson and Michael C. Jobson, Lockhaven, Pa.

105,805.—MACHINE FOR BENDING CORRUGATED-METAL PLATES.—Asa Johnson, Brooklyn, N. Y.

105,806.—FIRE-PLACE.—Anson B. Johnson, Washington, Ind.

105,807.—HOPPER FOR MILLS AND GRAIN-DRILLS.—Russel P. Johnson, Griffin, Ga.

105,808.—CASE FOR TURBINE WATER-WHEELS.—Jacob O. Joyce, Dayton, Ohio.

105,809.—COMPOSITION FOR "ENCAUSTIC" PAINTING.—William H. F. Kehrwieder, Philadelphia, Pa.

105,810.—DRILL FOR SEED-PLANTERS.—John F. Keller, Hagerstown, Md., assignor to himself and William Updegraff, same place.

105,811.—FERTILIZER ATTACHMENT TO SEEDING-MACHINES.—John F. Keller, Hagerstown, Md., assignor to himself and William Updegraff, same place.

105,812.—SELF-ACTING MULE FOR SPINNING.—Prentiss J. Kent, and Nathan W. Bancroft, Worcester, assignors to themselves, J. Rich Kent, and John G Avery, Spencer, Mass.

105,813.—VALVE FOR STEAM AND OTHER PUMPS.—Lucius J. Knowles, Worcester, Mass.

105,814.—STALL FOR PREVENTING CRIBBING.—John Krauss, Clarence, N. Y., assignor to himself and Henry Lapp, same place.

105,815.—SPINNING-MACHINE.—Wm. La Banister and Lorenzo V. Dogget, Pacific, Wis.

105,816.—HEATING-STOVE.—Silas Hoffman La Rue, Allentown, Pa.

105,817.—PIPE-COUPLING.—Wm. A. Lighthall, New York, N. Y.

105,818.—FAUCET.—James H. Lord, San Francisco, Cal.

105,819.—VAPOR OR GAS-BURNER.—John C. Love, Philadelphia, Pennsylvania.

105,820.—SHUTTLE FOR SEWING-MACHINE.—Lucius Lyon, New York, N. Y.

105,821.—HORSE-COLLAR.—Charles K. Marshall, New Orleans, La., assignor to the Climax Horse-Collar Company, New York City

105,822.—COMBINED HAIR-CURLER AND CRIMPER.—Elisha Matteson, Jersey City, N. J, he having assigned two-thirds of his right to Abraham Hoagland, same place.

105,823, antedated July 22, 1870.—PROCESS FOR COATING OBJECTS WITH COLLODION AND ITS COMPOUNDS.—John A. McClelland, Louisville, Ky.

105,824.—TURNING DEVICE.—William H. McMillan and David Morris, Philadelphia, Pa., assignors to Morris, Tasker & Co., same place.

105,825.—HAND CORN-SHELLER.—William A. Middleton, Harrisburg, Pa.

105,826.—WEATHER-BOARD SCRIBE.—Ahraham Miller and Uriah Faris, Red Rock Township, Iowa.

105,827.—WRENCH.—Charles H. Miller, Buffalo, N. Y., assignor to himself and Michael Doll, same place.

105,828.—CULTIVATOR.—Isaac Miller, Worth, Mich.

105,829.—AWNING FOR CARS, &c.—James H. Monce, New York, N. Y.

105,830, antedated July 16, 1870.—THAWING DEVICE FOR HYDRANTS AND FIRE-PLUGS.—James C Moore, Philadelphia, Pa.

105,831.—WASHING-MACHINE.—Henry J. Moreland, Whitehall, Illinois.

105,832.—WAGON-SEAT FASTENING.—Fred Norris, Freedom Plains, N. Y.
105,833.—HORSE HAY-RAKE.—Sherman R. Nye, Barre, Mass.
105,834.—TELEGRAPH-INSULATOR.—Samuel Oakman, Boston, Massachusetts.
105,835.—SHOW-CASE FOR RIBBONS, &c.—George W. Pagett, Oxford, Ill.
105,836.—MANUFACTURE OF HOLLOW FELTED ARTICLES.—Charles W. Palmer and Henry E. Palmer, Lynn, and Charles Houghton, Boston, Mass., assignors to Charles Houghton.
105,837.—HAY-LOADER.—Isaac J. Parker, Buffalo Grove, Iowa.
105,838.—SPADE AND SHOVEL.—John W. Pearce, Suisun, Cal.
105,839.—CYLINDER FOR MIXING FERTILIZERS.—Leman P. Pitcher, Salina, N. Y.
105,840.—MORTAR-MILL.—Leman B. Pitcher, Salina, N. Y.
105,841.—STEAM-ENGINE GOVERNOR.—William H. Place, New York, N. Y.
105,842.—WASHING-MACHINE.—Daniel B. Pond, Woonsocket, Rhode Island.
105,843.—PLOW.—Samuel W. Pope, Louisville, Ky.
105,844.—SUBSOIL-PLOW.—Elam M. Query, Harris Depot, N. C.
105,845.—BRAKE FOR WAGONS.—Henry Racine, Paola, Kansas.
105,846.—MACHINE FOR PRESSING SEAMS AND CUTTING WELTS FOR BOOTS AND SHOES.—Edwin Reed, Kingston, Mass.
105,847.—STEAM-GOVERNOR.—A. F. Reeder, Normal, Ill.
105,848.—SAWING-MACHINE.—Augustus Renetzky, Lincoln, Ill.
105,849.—SULKY ATTACHMENT TO PLOWS.—James H. Reynerson and John Worrell, Clayton, Ind.
105,850.—CABINET-BEDSTEAD.—Andrew J. Roberts, Boston, Massachusetts.
105,851.—CURING AND PRESERVING MEAT, &c.—Adolphe Rock, New Orleans, La
105,852.—TUCK-CREASING ATTACHMENT FOR SEWING-MACHINES.—James Billings Safford, San Francisco, Cal.
105,853.—SPRING BED-BOTTOM.—Martin Van Buren Shepard, Chicago, Ill.
105,854, antedated July 15, 1870.—SPRING CURTAIN-FIXTURES.—John Shorey, Lowell, Mass.
105,855.—TYPE-SETTING MACHINE.—John T. Slingerland, New York, N. Y.
105,856.—PANTALOONS.—Theodore E. Sloan, Brooklyn, N. Y.
105,857.—SAFETY MEASURING FUNNEL.—Franklyn H. Smith, Burke, Vt.
105,858.—MACHINE FOR DITCHING AND HEDGING.—Wm. Stacy, Hardin County, Iowa.
105,859.—CIGAR-MACHINE.—George W. Tanner and Francis D. Bliss, Providence, R. I.
105,860.—CHUCK.—Stephen P. M. Tasker, Philadelphia, Pa.
105,861.—DIE-STOCK.—Stephen P. M. Tasker, Philadelphia, Pa.
105,862.—MECHANISM FOR RETAINING, ADJUSTING, AND SEWING PARASOLS.—William John Tate, Philadelphia, Pa., assignor to William A. Drown & Co., same place.
105,863.—RAILROAD RAIL-SPLICE.—George Oscar Taylor, Hamilton, Va.
105,864.—HOT-AIR FURNACE.—Geo. G. Thomas, St. Louis, Mo.
105,865.—CORN-MARKER.—Jesse B. Thomas, Centreville, Ind.
105,866.—GRAIN-DRILL.—John H. Thomas, Springfield, Ohio.
105,867.—LAMP.—George W. Thompson, Buffalo, N. Y.
105,868.—CLAMP FOR BRIDGES.—Lucius E. Truesdell, Chicago, Illinois.
105,869.—CARPENTERS' PLANE.—Charles E. Tucker, Boston, Mass., assignor to himself and T. L. Appleton, same place.
105,870.—MACHINE FOR MOTIVE POWER.—Horace Wickham, Jr., Chicago, Ill.
105,871.—CURTAIN-FIXTURE.—John H. Wilhelm, Chicago, Ill.
105,872.—CORN-SHELLER.—John B. Wolford, Lancaster, Ohio.
105,873.—MACHINE FOR NICKING SCREW-BLANKS.—Aurin Wood, Worcester, Mass
105,874, antedated July 15, 1870.—PERCUSSION CAP.—B. F. Woodside, McDonald Station, Tenn.
105,875.—CANDLESTICK.—Henry Zahn, San Francisco, Cal.
105,876.—CARRIAGE-STEP.—Wilson W. Knowles, Plantsville, Conn.

REISSUES.

4,078.—MECHANICAL MOVEMENT.—Henry J. Case, Nelson Chapin, and Charles Richardson, Auburn, N. Y., assignees of Henry J. Case.—Patent No 89,026, dated April 20, 1869.
4,079.—PAPER FOLDING MACHINE.—Cyrus Chambers, Jr., Philadelphia, Pa.—Patent No. 15,842, dated October 7, 1856
4,080.—MEDICAL VACUUM APPARATUS.—John G. Hadfield, Cincinnati, Ohio.—Patent No. 72,631, dated December 24, 1867.
4,081.—SHANK-SPRING.—Edward Heaton, New Haven, Conn.—Patent No. 75,266, dated March 10, 1868.
4,082.—Division A.—STEAM-GENERATOR.—John B. Root, for himself and Thomas C. M. Paton, assignee of John B. Root, New York, N. Y.—Patent No 74,146, dated February 4, 1868.
4,083.—Division B.—STEAM-GENERATOR.—John B. Root, for himself, and Thomas C. M. Paton, assignee of John B. Root, New York, N. Y.—Patent No. 74,146, dated February 4, 1868.

DESIGNS.

4,257.—TRADE-MARK.—John Adams, Birmingham, Pa.
4,258.—CARPET-PATTERN.—James Allinson, Philadelphia, Pa., assignor to James Bromley & Brothers, same place.
4,259.—LAMP.—James S. Atterbury and Thomas B. Atterbury, Pittsburg, Pa.
4,260.—JELLY GLASS.—William Doyle, Birmingham, Pa.
4,261.—GLASS-WARE.—William M. Kirchner, Pittsburg, Pa., assignor to the National Glass Company, Bell Aire, Ohio.
4,262.—CORN-HUSKER.—Almon T. Morris, Nevada, Ohio.
4,263.—GLASS-WARE.—John Oesterling, Wheeling, West Va.
4,264.—TIP OF A SWORD-SCABBARD.—Virgil Price, New York, N.Y.
4,265.—SWORD-GUARD.—Virgil Price, New York, N. Y.
4,266.—TRADE-MARK.—Henry C. Rogers, Village of Sauquoit, Paris, N. Y.
4,267.—TYPE.—Richard Smith, Philadelphia, Pa., assignor to Mackellar, Smiths, & Jordan.

New Method of Working Scrap Steel.

Two mechanics employed in the establishment of Messrs. NEAFIE & LEVY, Philadelphia, claim to have discovered a new method of working *scrap steel* into a tough, merchantable bar, equal to all and superior to most ordinary grades. A correspondent, describing the process, says:

"In several cases these bars were made of extremely small pieces, files, &c., &c., merely fagotted together; heated until it would appear all character of steel was gone, then covered lightly with the preparation and drawn down under the hammer. From this steel so made, sledges, turning and planing tools, chisels, flatteners, slotting machine tools, crank pins, guide bars, valve seats, &c., &c., have been made. The tools will not fly or chip, and have lasted better and done more than any used previously in the establishment where they were made. The crank pins, &c., have stood greater tests than any previous; and in an establishment like that of Messrs. NEAFIE & LEVY, where steel does not mean iron, or converted iron either, and where work, before it leaves their shop, has to undergo the most severe test used in this country, this 'means business.' Perhaps the most gratifying part of the process is that this steel can be manufactured at a cost of labor and flux not to exceed *two and a half cents per pound!* As the cost of the scrap is known to the trade, and the cost of bar or ingot steel, the advantages are evident."

The process was also tested on Bessemer steel. A pile was made of twelve pieces, one foot each, of English Bessemer rail ends, heated in the furnace for half an hour and welded solid under the hammer, with the preparation applied, into a bloom. This was reheated, cut in two, after being tested by upsetting, and made into a crank pin, which stands any test applied. The weight of the rail ends was some two hundred pounds, and the steel was as tough and fine-grained as any first class steel could be. Of a piece of Bessemer thus treated, a chised was made, which cut iron with the best. If these statements are true, the practical benefits of the discovery can scarcely be estimated.

The Chassepot Gun.

As the French rely mainly on this famous weapon for success as an infantry arm against the improved Prussian needle gun, some account of it will doubtless interest our readers. It is a breech-loading needle gun, like the Prussian. As in that weapon, so in this, a cylinder or bolt is moved by a lever pressed down on the right side of the weapon when it is loaded, and when this lever is pulled back, an opening is seen, which admits of the insertion of the cartridge in the barrel. In this cylinder there is a rod moved by a bell-spring. At its extremity the needle is fixed by means of a "muff;" the needle itself is a thread of steel, terminating in a point at the side of the barrel. The rod-spring is connected with the hammer, which, guided by a roller to avoid friction, receives from the thumb of the soldier a movement following the axis of the gun, which brings the tumbler of the lock against the follower, where it remains fixed until the trigger is pulled. So far the Chassepot differs but little from the needle gun. The main difference between them is in the use of India-rubber for expansion to fill up the barrel, instead of two cones, as in the Prussian gun. When the breech is shut the India-rubber ring, or obturator, as it is called, penetrates into a conical chamber at the base of the barrel. This is composed of a piece called the "head of the breech," and ending in a steel button, which is shaped like a flat disk on the side of the breech, and whose diameter is a little less than that of the chamber. Between the part of the moveable cylinder and and the anterior part of the button a ring of India-rubber is placed. This is vulcanized and the rod passes through it. This ring is composed of three round pieces placed together; the two outside ones are very hard, the middle one is more elastic. The button carries on its centre a tube 0.50 inch long, which the needle passes through, and which penetrates the barrel; the latter is slightly enlarged at the breech to receive the cartridge. To prevent accidents, a screw is fixed upon the hammer, and held in a longitudinal opening in the breech, when the weapon is closed. It thus permits the spring to dart the needle into the cartridge. In every other position of the cylinder, this screw catches against the back part of the breech, so that the hammer cannot act. A second notch, less deep than the first, allows the hammer to fall about half of its course. When the lever is pressed to the right, a strong shoulder on the cylinder rests itself against the fixed piece which surrounds the latter, serving it as a guide, and hindering ever movement at the back of the cylinder. The weapon is now ready for firing.

The cartridge is composed of a sheath or case of paper, at the bottom of which is fitted tight a disk of paste-board, pierced in the centre by an opening, in which is a cap exactly like that used for percussion locks, only smaller. The edges resting on the pasteboard give to the priming, the opening of which is turned toward the base of the sheath, sufficient resistance to enable the shock of the needle to produce its effect, and two holes pierced at the bottom of the cap permit the jets of flame which are produced at the moment of deflagration, to penetrate the charge. A little morsel of cloth introduced into the priming, forces the incandescent gases to escape by these two openings and increases the resistance of the opposite side. And lastly the bottom of the powder case or sheath is covered with stiff paper. Thus complete, the case receives five and half grammes of powder lightly poured in, and the ball, wrapped in a paper envelope and strengthened at the base by a thick piece of pasteboard, is attached to it by a ligature.

The projectile is a ball of a pointed cylindrical shape, weighing twenty-five grains, and slightly swelling at the back. It has no grooves, and is very much lengthened. The charge is made with a special kind of powder. This weapon possesses a very long range of fire, and does execution at a thousand yards distance, with a very slight elevation. There is but one form of it for both infantry and chasseurs. The latter will have a light bayonet added to it, while the infantry have a four-angled sword bayonet. The drill relating to the Chassepot has five movements, viz:—1. *To Arm.* Seize the gun wit the left hand and rest the butt-end on the right side; then, with the right hand on the handle, the forefinger on the guard, place the thumb on the head of the cock and pull it back until the follower catches in the tumbler. 2 *To open the Weapon.* Turn the lever from right to left and force the breech back. 3. *To Load.* Seize the cartridge and insert it in the barrel. 4. *To close the Weapon.* Push back the breech and bring down the lever on the right side of the gun. 5. *To Fire.*

During the fourth movement, the cartridge, pushed back by the tube which terminates the obturator, enters the chamber destined to receive it, and thus leaves behind it a conic space filled with air. At the moment when the trigger is pulled, the needle, passing through the head of the breech and the tube which rests against the cartridge, strikes the priming and occasions the explosion. The powder escapes but little from the case, so that it is not, as in the Prussian gun, exposed for any great distance to incandescent gases. At the moment of the detonation, the gases of the powder, as well as the air contained in the chamber, react upon the buttom which terminates the head of the breech; the latter, compressing the India-rubber against the base of the cylinder, forces that elastic substance against the sides of the barrel, and thus prevents all waste. The gases accumulated in the hot chamber expel the fragments of the paper and case of the caatridge, and thus allow a fresh charge to be inserted, without any trouble as to what remains of the previous charge. The weapon can be loaded and fired with great rapidity.—*Philadelphia Ledger.*

BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf.

IMPORTANT TO INVENTORS.

WESTERN AND CO.'S PATENT AGENCY.

CHARLES ROGERS, Solicitor and Manager.

In connection with the publication of the ENGINEERING and MINING JOURNAL and the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtaining of patents.

Being possessed of superior facilities, in connection with our associate attorneys in Washington and foreign countries, for the successful prosecution of this business, we do not hesitate to guarantee satisfaction to all who may entrust their business to our care.

We have engaged as solicitor and manager Mr. CHARLES ROGERS, a well-known expert in this department. Being a practical mechanic, and having been an examiner in the Patent Office at Washington for a number of years, besides enjoying an experience of more than twenty years as a solicitor of patents, Mr. ROGERS is intimately acquainted with all the details of the business, both in and out of the office.

The specifications, drawings, etc., prepared in our office, will be found to compare favorably with those prepared by any other establishment, while the intimate acquaintance of our manager with the routine of business in the Patent Office, gives us a decided advantage in managing difficult cases.

We are fully prepared to prosecute Rejected Cases and Cases in Interference and Infringements, and also to procure Reissues and Extensions of Patents.

We can also furnish Models for use in the Patent Office, to parties who may desire it, as we have made arrangements for this purpose with one of the most skilful machinists in this country, who possesses every facility for getting up models in the most perfect manner, at short notice, and on reasonable terms.

We shall give special attention to the prosecution of Rejected Applications, which have been improperly prepared by the inventor or incompetent attorneys.

We shall be ready at all times to furnish all necessary information and advice to intending applicants, and give our opinion as to the patentability of their inventions, free of charge; and we make it a rule never to take charge of a case unless we see a reasonable probability of obtaining a patent without first giving the inventor our candid opinion as to the probable result of the application.

OUR CHARGES.

Our charges are as moderate as those of any other responsible patent attorneys, as will be seen from the following figures: For preparing a case (whether simple or complicated) and attending to its passage through the Patent Office, our fee is from $30 to $40, which includes all the necessary papers and drawings. If the application is rejected we make no further charge, but prepare all necessary amendments, and, if requisite, appeal to the Board of Examiners-in-Chief. Most Patent Attorneys make an additional charge on each adverse action of the Patent Office, but we have found it more satisfactory to all parties interested to make our full charge at first; and as we expect no contingent fees, it is to our interest to prepare our cases properly at the commencement, thus avoiding annoyance to ourselves and delay in getting out the patent.

The cost of getting out a patent through our agency is—

For first Government fee, stamp, etc	$16
" our fee	$30 to 40
" final Government fee	20
Total	$66 to $76

If the case has to be appealed, the applicant pays the Government fee on appeal, $10; but we shall ordinarily make no additional charge for our services. The first two items are payable when the application is sent in, and the second Government fee when a patent has been allowed. Before an appeal is taken, in any case, the applicant will be fully advised of all facts and charges, and no proceedings had without his sanction; so that all inventors who employ our agency will know in advance what their applications and patents are to cost.

For Rejected Applications prepared by others, our charges vary somewhat according to the nature of the case, but are generally as follows:

In advance, on receiving the case	$10
When the patent is allowed	$20 to 30
Total	$30 to $40

the applicant paying such Government fees as may be required.

For preparing and filling a Caveat,

Our fee is	$15
Government fee	10
Total	$25

For attending to the obtaining of Releases, Extensions, etc., and preparing Assignments, our charges vary according to the labor involved.

We are possessed of all the facilities for the successful prosecution of applications for patents in Great Britain, France, Belgium, and other foreign countries, on favorable terms.

Inventors who reside out of New York, and wish to procure a patent, need not go to the expense of visiting this city or Washington, but may send us a model of their invention, or a sketch and brief description; this will enable us to decide as to its probable novelty and patentability, and we can proceed at once to prosecute the case. We shall, however, be glad at all times to see our friends from any section, and give them such information as we are possessed of relating to patents, free of charge. A Post-office order for $16, to pay the first Government fee and stamp duty, should be sent along with the model; our fee $30 to $40, being payable as soon as the application is ready to be sent to Washington.

Patents granted through this agency will be described and illustrated in the columns of the ENGINEERING AND MINING JOURNAL or the MANUFACTURER AND BUILDER, without further charge to the inventor than the cost of the necessary cuts.

All communications to be addressed to

WESTERN & COMPANY,
37 PARK ROW, NEW YORK.

P. O. Box, 5969.

Advertisements.

The special advantages of the ENGINEERING AND MINING JOURNAL, *as a medium for advertisers, are so great and so widely known that it may seem almost needless to call attention to them. It is extensively circulated among the engineers of the country and takes a position in this respect before any other publication of the kind. It has a large and constantly increasing circulation among miners and mine owners, and men connected with mining operations generally. As it is the only paper in the country that makes this subject a specialty it has this field entirely to itself, and is the only direct and reliable means of reaching this class of persons. Being kept on file by almost every subscriber, it is doubly valuable as a permanent means of keeping an advertisement before the public. It is the recognized organ of the coal trade, and is taken extensively by the trade throughout the country and presents the very best means of reaching that very important class of men.*

Rates of Advertising.

The rate of advertising, compared with those of other weekly industrial publications, are very low, especially when the class of consumers among which its large circulation is almost entirely confined, is taken into consideration.

Back Page.....40 cents a line.
Inside Pages.....25 cents a line.

Engravings may head advertisements at the same rate per line, by measurement, as the letter-press.

STEAM PUMPS.

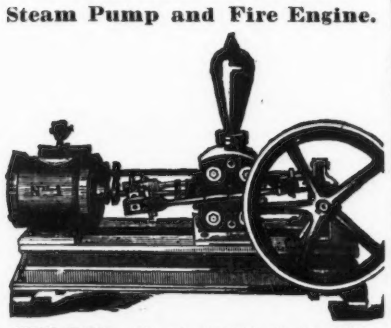
THE WOODWARD

Steam Pump Manufacturing Company.

MANUFACTURERS OF THE

WOODWARD PATENT IMPROVED SAFETY

Steam Pump and Fire Engine.



STEAM, WATER, AND GAS FITTINGS OF ALL KINDS.

Also dealers in WROUGHT IRON PIPE, BOILER TUBES, etc. Hotels, Churches, Factories, and Public Buildings, heated by Steam, Low Pressure.

Woodward Building, 76 and 78 Centre street, corner Worth street, New York. Formerly 77 Beekman street.

mar 14-1y GEORGE M. WOODWARD, Pres't.

Niagara Steam Pump Works.

FIRST PREMIUM

AMERICAN INSTITUTE, 1867.

CHARLES B. HARDICK,

9 ADAMS STREET, BROOKLYN, N. Y.

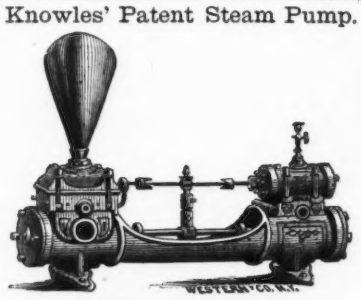
Sole Manufacturer of

HARDICK'S PATENT DOUBLE-ACTING

Steam Pump and Fire Engine.

Patented in England, Belgium and France. Send for circular. feb-13-1y

Knowles' Patent Steam Pump.



FACTORIES AT WARREN, MASS.

WAREHOUSE, NO. 126 LIBERTY STREET, NEW YORK.

Air Pumps, Blowing Engines, Hydraulic Pressure Pumps, New Locomotive Pumps, Fire Pumps, Boiler, Feed, Marine, Drainage, Sugar-work, Brewery, Distillery, Oil and Wrecking Pumps.

Improved Horizontal and Vertical

MINING PUMPS

(Working with Plungers, and especially arranged for pumping water containing dirty or gritty matter.)

Pumps for every possible duty, and all fully guaranteed. Also,

KNOWLES' PATENT SAFETY BOILER FEEDER

Send for Illustrated Circular. 10-1yjuly

J. CLAYTON'S

Patent Fly Wheel and Direct Action

STEAM PUMPS,

HAND PUMP AND

STEAM ENGINE

COMBINED.

These pumps are the cheapest first-class pumps in the market.

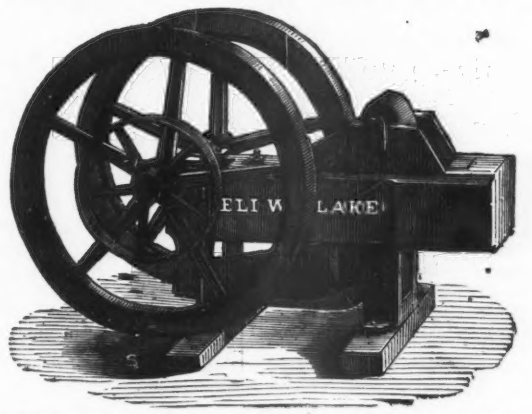
All sizes made to order at short notice.

JAMES CLAYTON, 24 & 26 Water st.,

Nov18-tf Brooklyn, N. Y.

MISCELLANEOUS.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

JOHN A. GRISWOLD, ERASTUS CORNING,

ERASTUS CORNING, JR., CHESTER GRISWOLD.

JOHN A. GRISWOLD & CO.,

PROPRIETORS OF THE

RENSSELAER IRON WORKS,

TROY, N. Y.

Bessemer Steel Works, Fort Edward Blast Furnace and Columbia Blast Furnace

MANUFACTURERS of PIG IRON, RAILROAD, MERCHANT AND SHIP IRON,

Bessemer Steel Rails, Axles, Tyres, Shafting Plates and Steel Forgings,

OF ALL DESCRIPTIONS.

Office in New York, No. 56 Broadway.

May 17:1y

NEW JERSEY ZINC COMPANY.

B. S. GIBLIN, Treasurer. GEORGE A. BELL, President

WORKS NEWARK, N. J., OFFICE No. 61 MAIDEN LANE NEW YORK.

Franklinite Pig Iron (Spiegeleisen), Spelter, Oxide of Zinc, Spiegeleisen Cinder for Blast Furnaces.

May 24:1y

LEHIGH ZINC COMPANY.

GORDON MONGES, Treasurer. B. C. WEBSTER, President.

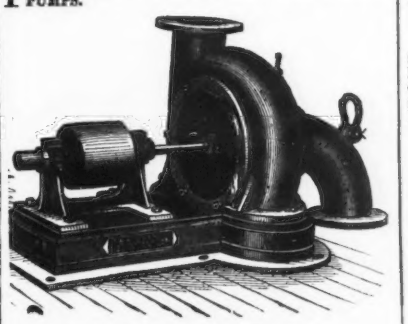
WORKS, BETHLEHEM, PA. OFFICE, 333 Walnut Street, Philadelphia.

JOHN JEWETT & SONS, AGENTS, 182 FRONT STREET, NEW YORK.

OXIDE OF ZINC, SPELTER, SHEET ZINC.

Jun28:1y

IMPROVED MINING AND WRECKING PUMPS.



LEBBY AND DUC PATENTS.

MANUFACTURED SOLELY BY

T. F. ROWLAND, CONTINENTAL WORKS,

Greenpoint, Brooklyn, N. Y.

New York Office, No. 64 Broadway, Room 33.

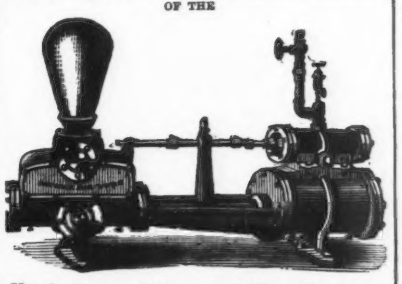
☞ Send for Illustrated Circular. july16-1y-is

NORWALK IRON WORKS,

SOUTH NORWALK, CONN.,

Sole Proprietors and Manufacturers

OF THE



Earle Steam Pump and Fire Engine,

(Patented in the United States, France, England and Belgium.)

Air and Vacuum Pumps,

STEAM AND BLOWING ENGINES,

Pumping Engines for Water Works, Horizontal and Tumbling Beam Engines, Mining, Wrecking, and Supply Pumps.

IRON AND BRASS CASTINGS, of every description.

☞ Send for Illustrated Catalogue. mch13-1y

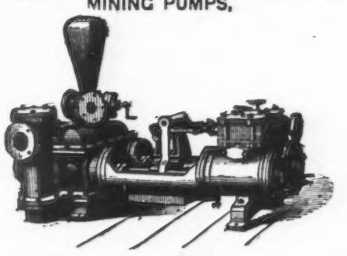
HYDRAULIC WORKS.

MANUFACTORY,

BROOKLYN, N. Y.

Steam Pumping Engines, Single and Duplex, Worthington's Patent, for all purposes, such as Water Works Engines, Condensing or Non-condensing; Air and Circulating Pumps, for Marine Engines; Blowing Engines; Vacuum Pumps, Stationary and Portable Steam Fire Engines; Boiler Feed Pumps, Wrecking Pumps,

MINING PUMPS,



Water Meters, Oil Meters; Water Pressure Engines; Stamp Mills for Gold, Silver and Copper Ore; Eaton's Patent Amalgamators for Gold and Silver; Steam and Gas Pipe, Valves, Fittings, etc. Iron and Brass Castings.

☞ Send for Circular.

feb1-1y H. R. WORTHINGTON, 61 Beekman street, New York.

ALBERT BRIDGES,

MANUFACTURER AND DEALER IN

Railway and Mining Supplies and Machinery.

Hot and Cold Punched Nuts, Bolts, Lag Screws and Washers.

Belting, Packing Hose, Rubber Springs, Car Trimmings, Steam Pumps.

Ball's Patent Telescope Jack.

NO. 46 CORTLANDT STREET,

P. O. Box, 2843. NEW YORK.

Aug 31-1y

COAL SHIPPERS.

THE DESPARD COAL COMPANY OFFER their Superior DESPARD COAL to Gas Light Companies throughout the country.

MINES IN HARRISON COUNTY, West Virginia.

Wharves, Locust Point, Company's Office, No. 29 South st. } Baltimore.

AGENTS:

PARMELE BROTHERS, No. 32 Pine street, New York.

BANGS & HORTON, No. 31 Doane street, Boston.

Among the consumers of Despard Coal we name Manhattan Gas Light Co., New York; Metropolitan Gas Light Co., New York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C. Portland Gas Light Co., Portland, Maine.

☞ Reference to them is requested. may30-1y

LEWIS AUDENRIED & CO., MINERS AND Shippers of the following celebrated ANTHRACITE COALS.

From Philadelphia and the Mines,

DIAMOND, Red Ash; SPOHN, Red Ash; ORCHARD, Pink Ash; BROAD MOUNTAIN, White Ash; LOCUST MOUNTAIN, White Ash; BLACK HEATH, White Ash; Old Company's Lehigh; Wilkesbarre.

From Port Johnston and Jersey City,

Old Co.'s Lehigh, Hazleton, Wilkesbarre, and Shenandoah Coals.

Also the superior CUMBERLAND COALS.

BROAD TOP, SEMI-BITUMINOUS, at Philadelphia. BARTON, GEORGES CREEK, at Baltimore. BARTON, GEORGES CREEK, at Alexrndria.

205 Walnut street, Philadelphia; 14 Kilby street, Boston 34 Westminster st., Providence; 24 Second st., Baltimore 110 BROADWAY, NEW YORK. Jan13.y

G. B. LINDERMAN & CO.,

MINERS,

Sugar Loaf, Lehigh Coal.

OFFICE, 50 TRINITY BUILDING, 111 BROADWAY, may23-1y NEW YORK.

COXE BRO.'S & CO., CROSS CREEK COLLIERY, Miners and Shippers of the Celebrated

Cross Creek Free Burning Lehigh Red Ash COAL.

FROM THE BUCK MOUNTAIN VEIN.

OFFICES;

Philadelphia, No. 341 Walnut street.

Drifton, Jeddo P. O., Luzerne Co., Pa.

Agent in New York, SAMUEL BONNELL, Jr., Room 43, Trinity Building, feb-1y 111 Broadway.

THE FAIRMONT GAS COAL COMPANY, OF NEW YORK.

OFFICE

TRINITY BUILDING, 111 BROADWAY, ROOM NO. 71.

WHARVES AT

LOCUST POINT, BALTIMORE.

MINES AT

FAIRMONT, MARION COUNTY, WEST VIRGINIA.

The Fairmont Gas Coal Company, of New York, solicit the orders of Gas Companies for their VERY SUPERIOR GAS COAL.

The Coal from their mines is remarkably free from sulphur, and will be carefully mined and carefully shipped, free of slate and other impurities. This Coal has an illuminating power of 19 candles, yielding over 10,000 cubic feet of Gas to the ton, and an excellent Coke.

Refer to the Manhattan Gas Light Co., of New York, and the New York Gas Light Co., of New York.

N. MEYLERT, President.

HIRAM BENNER, Sec. and Treasurer. Ap5:2t

LOVE, BOYER & CO.,

SHIPPERS OF

Anthracite and Bituminous Coals,

AMERICAN BUILDINGS, No. 334 WALNUT STREET, And Pier 19 Port Richmond. PHILADELPHIA.

Agents for Cumberland Vein Bituminous Coal. Mar 8:6m

HONEY BROOK COAL COMPANY, Exclusive Miners and Shippers of the Celebrated

Honey Brook Lehigh Coal,

No. 111 BROADWAY, NEW YORK.

JAMES H. LYLES, Agent.

Wharves, Port Johnson, N. J. Philadelphia office, 209 Walnut street.

ap20-1y J. B. McCREARY, President.

RANDOLPH BROTHERS, Sole Agents of the original

Spring Mountain Lehigh Coal.

Extensively used for Smelting Iron.

☞ Rooms, 28 and 30 Trinity Building, pr6tf NEW YORK.

POWELTON COAL AND IRON COMPANY, Sole Shippers of the Celebrated

Powelton Semi-Bituminous Gas AND ANTHRACITE COALS.

104 Walnut street, Philadelphia.

BRANCH OFFICES:

New York, Trinity Building; 17 Doane street, Boston Cleveland, O.; Fittsburgh, Pa. jan30-1s

THE NEWBURGH ORREL COAL COMPANY.

Mines at Newburgh, Preston Co., W. Va.

Company's Office, No. 52 S. Gay St. Baltimore, Md.

C. OLIVER O'DONNELL.....President.

G. W. MAHOOL.....Secretary.

This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs., of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York, the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y., the Baltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. sep21-1y

WHITE, FOWLER & SNOW.

Wilkesbarre and Lehigh Coal,

FOR STEAM AND FAMILY USE.

OFFICE

Room No. 75, 111 BROADWAY, (Trinity Building).

JNO. WHITE, LINDLEY H. FOWLER, LOUIS T. SNOW.

jan1-1y

WILKESBARRE COAL, DELIVERED DIrect from the Mines of

The Wikesbarre Coal and Iron Co.,

or for re-shipment at

HOBOKEN AND JERSEY CITY.

OFFICE:

ap1-1y No. 80 Broadway, New York.

PUBLICATIONS.

NOW READY.

Third Edition, Seventh Thousand, Revised, Enlarged, and Improved,

HOPTON'S CONVERSATIONS on MINES,

BETWEEN

FATHER AND SON,

ENLARGED FROM 112 TO 192 PAGES.

The Following are the Contents:

Air, why it is propelled down, into and around the workings
" Quantity of, produced by the furnace.
" Friction of
" The great friction of produced by one mode of ventilation, and how reduced by another
" Pure added to impure (plans.
" Splitting of (plans)
" One current of (plans)
" One current of, and how to adopt separate currents (plan)
" Dividing of, but not into "separate and and distinct" current (plans)
" Crossings (see H on plans)
" Weight of in shafts
" How to find the weight of
" Table of pressure in shafts
" Expansion of
" Its velocity and force
" Rush of, into each division
" Quantity produced by natural ventilation
" Splitting, why it should be adopted
" Splitting, why the workmen object to Mr. Hopton adopting the mode
Anemometer, measurement of air by, engraving of
Area of a pit, how to find
Barometers, Showing the time of an outlet of gas in mines (engraving)
Bricks, how to find the number in the walling of a shaft.
Buddle's plan
Circumference of a pit, how to find
Coal, several ways of working it out, and why man methods of working it out are adopted
" Working out in banks (plans)
" Working it out in following up banks (plan)
" Working out in pillars (plans)
" Working out in long wall (plans)
" Working out in drifts (plans)
" Working out with no regularity (plan)
" Working out by the "end way" or in endings (plan)
Cubical Contents of a pit, how to find
Dialing, the mode of
Dials, several engravings
" How constructed
" How fixed in mine surveying
" Needle, its variations
Diameter of shaft
Dip of mine, how to find and lay on (plan)
Explosion, the power of an
" At Lund-hill, in what part of the mine it was supposed to take place (plan)
" How the power may be diminished
Furnace, how to find the horse-power of
" The place of fixing, to produce the largest ventilating current
" Engravings of ground floor, front and back view
" Remarks upon
Gases, (carbonic acid) composition of
" Do. properties of
" (After, or choke damp) composition of
" (Carburetted hydrogen) do.
" Choke damp and carbonic acid, not one and the same in quality
" The effect produced on people by inhaling such
" The quantity required for an explosive mixture
" The elasticity of
" The weight of
" The nature and quality of
" Why some mines generate and produce more than others
" Why some mines generate a mixture of
Goaf, or gob, how tramrods are made through (plan
Lund-hill (plan)
Managers, who are best competent to manage mines
Miscellaneous questions
Natural ventilation
Planning, how workings are laid on the plan
Regulations (see R on plans)
Safety Lamps, why flame will not penetrate through, engraving of
Sections on mechanical ventilation
Summary of accidents
Surveying, how mines are with the dial
Surveying, how mines are with the theodolite
Tables of weights and measures
Temperature on surface
Temperature in mines
Temperature, difference of between down and up-cast
Theodolites for mine surveying
Theodolites, how constructed
Theodolites, the magnetic needle dispensed with, and how workings are laid on plan, with Theodolite surveying
Theodolites, how mines are surveyed with them
Up-cast larger than down-cast (plan)
Ventilating mines by mechanical power
Ventilation, several ways of
Weather, how a change of affects the workings
Workmen, capabilities of

Testimonials, Reviews, etc.

"Such a work, well understood by miners, would do more to prevent colliery accidents than an army of inspectors."—*Colliery Guardian.*

"The book cannot fail to be well received by all connected with collieries."—*Mining Journal.*

"Its contents are really valuable to the miners of this country."—*Miner's Conference.*

"I have works priced at £4 that do not contain the same information."—W. W. KENRICK, Colliery Viewer.

"The work is replete on the subject of underground management."—M. BARNES, Colliery Proprietor.

"I have had twenty years' management. It is the best work I ever read, and deserves to be circulated in every colliery district."—JOSEPH EAMES.

WESTERN & CO.,
Sole Agents for the United States.

For sale at the office of the ENGINEERING AND MINING JOURNAL, 37 Park Row, New York, and through any Bookseller. Price $1.

PUBLICATIONS.

PUBLICATIONS OF THE

AMERICAN INSTITUTE OF ARCHITECTS.

WESTERN & COMPANY

Having made arrangements with the Committee on Library and Publications of the above Association, are prepared to furnish the publications of the Institute to the trade and the public.

The Publications consist of the Proceedings of the Annual Conventions of the Institute, and Papers read before the Chapters of that body, as well as Papers contributed by Members of the Institute and published by its Committee on Library and Publications.

They are elegantly printed Pamphlets of large quarto size, with two columns to a page.

The Pamphlets thus far issued comprise the publications for two years past, and cover transactions of three years.

LIST OF PUBLICATIONS TO DATE.

I.

PROCEEDINGS OF THE ANNUAL CONVENTION OF THE

American Institute of Architects

Held in New York, October 22d and 23d, 1867.

Comprising, Minutes of the Convention, The Annual Address by Richard Upjohn, President; Reports of the Trustees and Standing Committees, and the Closing Address.

32 Pages, Quarto.....Price, 30 cents.

II.

FIRE-PROOF FLOORS

FOR

Banks, Insurance Companies, Office Buildings, and Dwellings.

Tables Shewing the Distances from Centres at which Rolled Iron Beams should be Placed, and the Weight of Metal per superficial foot of the Floor,

BY R. G. HATFIELD, F. A. I. A.

8 Pages, Quarto.....Price, 30 cents.

III.

Proceedings

OF THE

SECOND ANNUAL CONVENTION

Held in New York, December 8, 1868.

Comprising the Minutes of the Convention, The President's Address by Richard Upjohn, Esq., and the Reports of Trustees and Standing Committees.

16 Pages, Quarto.....Price 40 cents.

IV.

REMARKS

ON

FIRE-PROOF CONSTRUCTION;

A Paper read before the New York Chapter of the American Institute of Architects, April 8, 1869.

BY P. B. WIGHT, F. A. I. A.

8 Pages, Quarto.....Price, 30 cents.

V.

THE

Architectural and Other Art Societies of Europe;

SOME ACCOUNT OF THEIR

ORIGIN, PROCESSES OF FORMATION, AND METHODS OF ADMINISTRATION,

With suggestions as to some of the conditions necessary for the maximum success of a National American Architectural-Art Society, with its local dependencies.

BY A. J. BLOOR,

FELLOW OF THE AMERICAN INSTITUTE OF ARCHITECTS

Read before the New York Chapter A. I. A., February 16, 1869.

62 Pages, Quarto..... Price, $1

VI.

PROCEEDINGS OF THE THIRD ANNUAL CONVENTION, held in New York, Nov. 16 and 17th, 1869.

Comprising the Annual Address by Richard Upjohn, President; the Reports of Trustees, Standing Committees and Chapters; papers read by Adolph Chess, R. G. Hatfield, and Richard Upjohn; Debates on matters of Professional interest, and the closing address of Professional Guilds, by E. L. Godkin. 69 pages quarto. Price $1.

The above Pamphlets may be had singly, and will be sent by mail to any address on receipt of the price.

THE TRANSACTIONS BOUND.

The Publications of the Institute may also be had bound in cloth, making a handsome quarto volume of 196 pages, comprising the Transactions of the Institute for three years, ending November 16, 1869, the time of holding the Annual Convention for 1869. Price $4.

WESTERN & COMPANY will also publish the papers to be read at the meetings of Chapters of the Institute, during the coming year in the ENGINEERING AND MINING JOURNAL, and abstracts in the MANUFACTURER AND BUILDER, which will be duly announced. Address,

WESTERN & COMPANY,
No. 37 PARK ROW, NEW YORK.

PUBLICATIONS.

THE MINES OF THE WEST:

A REPORT TO THE

SECRETARY OF THE TREASURY.

Being a full Statistical Account of the

MINERAL DEVELOPMENT OF THE PACIFIC STATES for the year 1868, with

Sixteen Illustrations,

and a Treatise on the Relation of Governments to Mining, with a delineation of the Legal and Practical Mining Systems of all Countries, from early ages to the present time. By

ROSSITER W. RAYMOND, PH.D.,

U. S. COMMISSIONER OF MINING STATISTICS.

CONTENTS:

INSTRUCTIONS FROM THE SECRETARY OF THE TREASURY.
LETTER OF THE COMMISSIONER TO THE SECRETARY.
REPORT:
PART I.—Observations of the present condition of the mining industry:
SECTION I.—*Notes on California:*
Chapter I.—The new Almaden mines.
II.—The Mother Lode of California.
III.—The quartz and placer mines of Nevada County.
IV.—Giant powder and common powder.
SECTION II.—*Notes on Nevada:*
Chapter V.—Present condition and prospects of the Comstock mines.
VI.—Ormsby, Washoe, and Churchill Counties.
VII.—Lander County.
VIII.—Nye County.
IX.—Lincoln County.
X.—Esmeralda County.
XI.—Humboldt County.
SECTION III.—*Notes on Montana:*
Chapter XII.—General geological features.
XIII.—Population, property, railroad, etc.
XIV.—Placer mines.
XV.—Quartz mines.
XVI.—Operations of the United States law.
SECTION IV.—*Notes on Idaho:*
Chapter XVII.—Report of Mr. Ashburner
XVIII.—The War Eagle tunnel.
XIX.—Bullion product.
SECTION V.—*Notes on other mining fields:*
Chapter XX.—Arizona.
XXI.—Utah.
XXII.—The Isthmus of Panama.
PART II.—The relations of government to mining:
Introduction.
SECTION VI.—*Mining law.*
Chapter XXIII.—Mining and mining law among the ancients.
XXIV.—Mining law in the middle ages.
XXV.—The Spanish mining law.
XXVI.—Modern German codes.
XXVII.—The code of France.
XXVIII.—Mining law of Switzerland.
XXIX.—Mining law of England.
XXX.—Mining regulations of Australia.
XXXI.—Mining laws of Canada.
XXXII.—Conclusions.
SECTION VII.—*Mining Education:*
Chapter XXXIII.—Means of disseminating information with regard to mining and metallurgy; the National School of mines.
SECTION VII.—*Mining Education—Continued.*
Chapter XXXIV.—The Freiberg School of Mines.
XXXV.—The Paris School of Mines.
XXXVI.—The Prussian School of Mines.
XXXVII.—The School of Mines at Clausthal.
APPENDIX.—Statistics of bullion, ores, etc., at San Francisco, for the Year 1868.

EXTRA CLOTH, $1 75.

Address, **WESTERN & CO.,**
No. 37 PARK ROW, New York.

ENGINEERS.

P. H. VAN DER WEYDE, M. D.,
(Late Professor of the N. Y. Medical College, of Mechanics, etc., at the Cooper Institute, and of Industrial Science at the Girard College, Philadelphia.)

Analytical & Consulting Chemist and Engineer.

RESIDENCE, 73 Seventh Street.
OFFICE: ENGINEERING AND MINING JOURNAL, 37 Park Row, New York City. jan30tf

R. P. ROTHWELL,
MINING AND CIVIL ENGINEER AND METALLURGIST,
From the Imperial School of Mines, Paris, member of the Geological Society of France, etc,
OFFICE, WILKESBARRE, PA.
Having had a large practical experience in Europe and this country, is prepared to examine and report on all kinds of mineral property, superintend mines, and metallurgical works, assay ores, etc. 18-2-qp

EDWARD C. MILLER, ARCHITECT AND CIVIL ENGINEER, Nos. 4 and 6 Broad street, Rooms 17 and 17½.
Has been engaged for many years in preparing plans for Churches, Dwellings and other Buildings, and in superintending their erection, and has superintended a considerable portion of the various constructions in the Central Park of New York, and Prospect Park, Brooklyn, having, in the latter case, prepared the plans, specifications and estimates of all the Bridges, the Fountain Basin, and minor works of adornment, upon which these structures have, for the most part, been completed. Is now ready to furnish Designs, Working-Drawings and Specifications for any description of building, and to superintend the construction thereof. References: Jas. S. T. Stranahan, Esq.; Martin Kalbfleish, Esq.; Andrew H. Green, Esq.; Charles Hudson, Esq. mar 8

A. D. BRIGGS & CO.,
Civil and Mechanical Engineers,
BUILDERS OF
Tuesdell's Patent Truss Bridge, and other Iron Bridges, Roofs, and Turn-Tables. Also Howe's Patent Truss Bridge and Roof, and other Timber Bridges and Turn-Tables. Particular attention given to repairing all kinds of Bridges. All work warranted to give satisfaction. Plans, Estimates, and Specifications, upon application.
July 20-1y SPRINGFIELD, MASS.

ADOLPH OTT,
CHEMICAL ENGINEER,
May be employed professionally as an expert on practical subjects, involving both Chemical and Mechanical knowledge. A specialist in various branches of Technology. Assays and Analyses of all kinds. Address, Editorial Rooms of the "Engineering and Mining Journal," 37 Park Row, New York City.
☞ Written communications preferred. nov28-tf

VIRGINIA AND WEST VIRGINIA MINERAL LANDS.
R. P. ROTHWELL will shortly commence an extended examination of the Coal and Iron Deposits in several portions of Virginia and West Virginia, and will be happy to undertake the examination of mineral properties for those owning or desiring to invest in those States. Address immediately,
R. P. ROTHWELL, Mining Engineer,
Ap 5-tf Coalburgh, Kanawa Co., Pa.

THEODORE ALLEN,
ENGINEER,
No. 45 William street, New York.
Designs and Specifications prepared for all kinds of Iron Ships and Steam Machinery. Construction and Repairs superintended. Experiments conducted. Advice given, etc. All kinds of Machinery furnished Manufacturers' prices. febs-tf

JULIEN THOULET, GRADUATE OF THE University of Paris, Member of the Society of Engineers of France, employed for several years in Spain, Italy, and America, as Chemist and Mining Engineer, would accept an engagement in a mining or smelting establishment. The highest references furnished
Address, by letter, No. 3 William street, New York.
Feb. 15:tf

WILLIAM F. McNAMARA,
SOLICITOR OF PATENTS
AND COUNSELLOR-AT-LAW.
No. 37 PARK ROW, NEW YORK, ROOM 22.
Advice in Patent Law given free. mar 8:tf

GEO. W. MAYNARD,
PROFESSOR OF MINING AND METALLURGY
at the
Rensselaer Polytechnic Institute, Troy, N. Y.
Is open to an engagement during the Summer months. Examination of Western gold or silver mining property preferred. June 14:tf

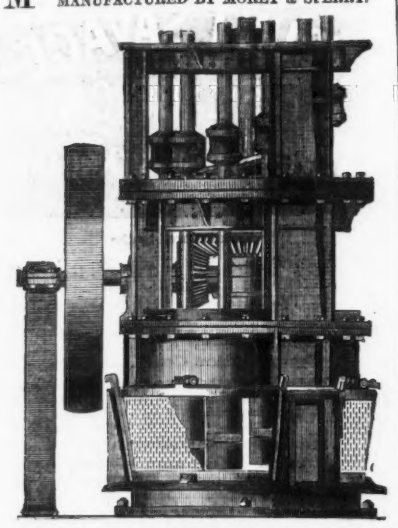
INSTRUCTION.

SCHOOL OF MINES, COLUMBIA COLLEGE.
FACULTY.—F. A. P. BARNARD, S.T.D., LL.D., PRESIDENT; T. EGLESTON, JR., E. M., Mineralogy and Metallurgy; C. F. CHANDLER, PH. D., Analytical and Applied Chemistry; JOHN TORREY, M.D., LL.D., Botany; C. A. JOY, PH. D., General Chemistry; W. G. PECK, LL.D., Mechanics; J. H. VAN AMRINGE, A.M., Mathematics; O. N. ROOD, A.M., Physics; J. S. NEWBERRY, M.D., LL.D., Geology and Paleontology. Regular courses for Mining Engineering; Metallurgy; Geology and Natural History; Analytical and Applied Chemistry. Special students received for any of the branches taught. Particular attention paid to Assaying. For further information and catalogues, apply to
DR. C. F. CHANDLER,
nov21-1y-is Dean of the Faculty.

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N. Y., a School of
ENGINEERING AND PRACTICAL SCIENCE.
Founded, 1824.
The courses of instruction, each extending over four years, are
1. CIVIL ENGINEERING.
2. MINING ENGINEERING.
3. MECHANICAL ENGINEERING.
4. NATURAL SCIENCE.
Degrees conferred in the different departments.
Applicants for admission must not be less than 16 years of age.
The course in Geodesy includes extensive engineering field practice. The proximity of iron, steel, and machine works, together with railroads, canals, and bridges affords great facility for thorough practical instruction. Laboratory privileges unsurpassed. Special courses in Assaying.
For Annual Register giving full particulars apply to
Prof. CHARLES DROWNE, Director.

MINING MACHINERY, ETC.

MINING MACHINERY OF ALL KINDS.
MANUFACTURED BY MOREY & SPERRY.



HOWLAND PATENT ROTARY BATTERY

of 12 stamps. It requires no frame to put it up. Guaranteed to crush 2½ to 3 tons per day to the stamp. The best Battery ever used for amalgamating gold, or crushing silver ores, dry or wet. Can be put up on a mine in running order for one-half the price of the straight battery, and in three days after its arrival at the mine. 12-stamp battery, 20,000 pounds, with frame complete, price $3,000; 6-stamp battery, 8,000 pounds, price $1,300. Every mill run at shop before shipping.

CALIFORNIA STAMP MILLS,

All the various styles of Pans, Amalgamators, Separators, Settlers, Concentrators, Dry or Wet, for working Gold, Silver or Copper Ores, the same as built in California and at lower prices. SHOES AND DIES made of the best white iron. Send sizes and we will make patterns and forward Shoes and Dies at low prices. Engines, Boilers and fixtures, and other Machinery made to order. Also, Howland's Patent Rotary Valve Double or Single Engines.

Irons for the best California 10-stamp mill, straight battery, complete, $1,600. Irons for low mortar, old style mill, much less.

☞ Send for a Circular.

Address

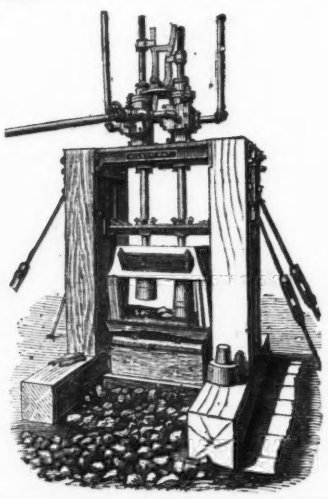
MOREY & SPERRY,
Jan 10:y 95 Liberty Street New-York.

THE WILSON PATENT

Steam Stamp-Mill Company,

OF PHILADELPHIA, PA.

Are now prepared to supply Miners and other parties with their



New Steam Stamp-Mills

AT THE SHORTEST NOTICE.

These Mills have now been in operation for upwards of a year, and have proved to be the most durable and efficient, as well as the lightest for transportation, of any mills now used. The valve gear is of the simplest and most durable construction, readily adjustable by movable cams on the piston rods or stamp stems, thereby giving the operator absolute control of the length and velocity of motion and force of the blow. These Mills are adapted for both dry and wet crushing, and for the hardest rock or softest cement. These Mills are every way equivalent to a Twenty Stamp Mill. For further particulars call on or address

THE WILSON PATENT STEAM STAMP-MILL COMPANY,
Aug31-1y 326 Walnut street, Philadelphia.

KROM'S DRY ORE CONCENTRATOR.

Concentration by means of Air

has long been attempted, but hitherto without satisfactory results. **S. R. Krom** has invented and patented machines which concentrate the various ores more perfectly than can be done by any other means.

The *MECHANICAL COMBINATIONS* are extremely simple, the machines therefore correspondingly durable. A continuous self-delivery of ore on one side and tailings on the other is effected, hence very little attention is required except keeping the hopper supplied with ore. The power of one man is sufficient to operate a machine that will concentrate one ton per hour.

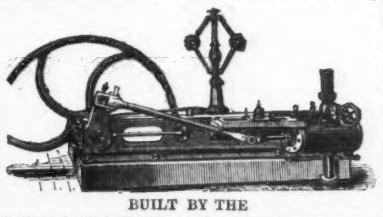
PARTIES INTERESTED IN MINING are invited to call at No. 210 Eldridge Street, New York, where they may see a machine in operation, and have samples of their own ores crushed and concentrated.

Illustrated Circulars may be had on application to

STEPHEN R. KROM,
jan10,1y-is No. 210 Eldridge Street, N. Y.

ENGINES, IRON WORK, ETC.

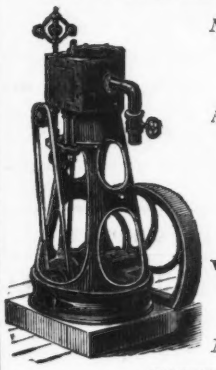
RIDER'S PATENT CUT-OFF ENGINES,
HORIZONTAL and VERTICAL,



BUILT BY THE

DELAMATER IRON WORKS,
Foot of West Thirteenth Street,

NEW YORK CITY.



AND BY THE

Albany St. Iron Works,

Corner of

Washington and Albany Streets,

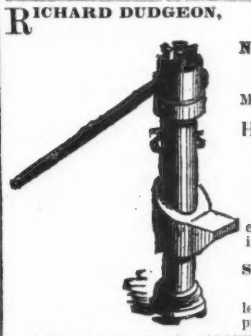
NEW YORK CITY.

HANDREN & RIPLEY,
Proprietors.

Also BOILERS, TANKS, and CASTINGS, of all descriptions nov 2:1y

---

RICHARD DUDGEON,



No. 24 Columbia st.,
NEW YORK,
Maker and Patentee of
Hydraulic Jacks
AND
Punches,
Roller Tube Expanders, and Direct Acting
Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for pressing on CARWHEELS or CRANK PINS made to order. May22:1y

---

DEPARTMENT OF PUBLIC WORKS,
237 Broadway.

TO CONTRACTORS.

Proposals, enclosed in a sealed envelope indorsed with the title of the work and the name of the bidder written thereon (also the number of the work as in the advertisement), will be received at this office until Tuesday, August 9, at 11 o'clock, A. M. for the following work:

No. 1. For paving Forty-second street, from Tenth avenue to Hudson River, with stone blocks.

No. 2. For paving Thirteenth street, from First avenue to East River, with stone blocks.

No. 3. For paving Forty-eighth street, from Fifth to Sixth avenue, with stone blocks.

No. 4. For paving Forty-sixth street, from Ninth avenue to Hudson River, with stone blocks.

No. 5. For paving Sixteenth street, from Avenue C to First avenue, with stone blocks.

No. 6. For paving Fifteenth street, from Eighth to Ninth avenue, with stone blocks.

No. 7. For paving Thirty-sixth street, from Seventh to Eighth avenue, with stone blocks.

No. 8. For paving Fifty-fourth street, from Eighth to Ninth avenue, with stone blocks.

No. 9. For paving Fifty-fifth street, from Tenth to Eleventh avenue, with stone blocks.

No. 10. For paving Fifty-sixth street, from Ninth to Tenth avenue.

No. 11. For sewer in Fifth avenue, between Thirty-fourth and Thirty-fifth streets.

No. 12. For sewer in Hudson street, between Canal and Vestry streets.

No. 13. For sewer in Thirty-sixth street, between Third and Lexington avenues.

No. 14. For sewer in Thirty-seventh street, between Third and Lexington avenues.

No. 15. For sewer in Greenwich street, between Barrow and Morton streets, and Weehawken street, between Christopher and West Tenth streets.

No. 16. For regulating, grading, curb, gutter, &c., Eighth avenue (Section 1), from Fifty-ninth to Seventy-seventh street.

No. 17. For regulating, grading, curb, gutter, &c., Eighth avenue (section 2), from Eighty-first to 100th street.

No. 18. For regulating, grading, curb, gutter, &c., Eighth avenue (Section 3), from 100th to 122d street.

No. 19. For regulating, grading, curb, gutter, &c., Eighty-first street, from Ninth avenue to Riverside Park.

No. 20. For regulating, grading, curb, gutter, &c., Fifty-sixth street, from Third to Sixth avenue.

No. 21. For regulating, grading, curb, gutter, &c., Sixty-sixth street, from First avenue to Avenue A.

No. 22. For curb, gutter, and flagging Fifty-ninth street, from Eighth to Ninth avenue.

No. 23. For curb, gutter, and flagging Mangin street, from Stanton to Houston street.

No. 24. For regulating, grading, curb, gutter, &c., Seventy-eighth street, from First avenue to Avenue A.

No. 25. For flagging Avenue A, from Seventeenth to Twenty fourth street.

Blank forms of proposals, together with the specifications and agreements, can be obtained on application at this office. WM. M. TWEED,
Commissioner.
NEW YORK, July 28, 1870. aug2,2t

NOTICE.—TO MINERS AND OTHERS.—LETTERS PATENT No. 53,194, granted March 13th, 1866, secured to me the Amalgamation of Metallic Ores, in a closed vessel, by the action of Mercury, Mercurial Fumes, Steam and Agitation, the heat being applied externally. All persons using, making or selling any Amalgamator in violation of my rights, are hereby required to settle for the past and arrange for the future, as legal proceedings will be instituted to enforce my rights in the premises. JOHN T. STAATS,
aug2,4teow No. 323 West Thirtieth street, New York.

MAGIC LANTERNS FOR SUNDAY Schools, Academies, Public Exhibitions, and Parlor Entertainments. Illustrated priced catalogues sent free. T. H. McALLISTER, Optician,
Dec 21.6m 49 Nassau street, N. Y.

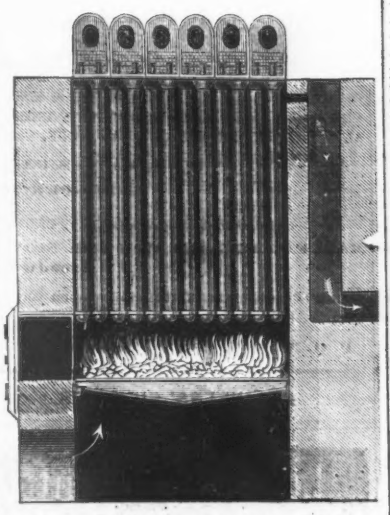
STEAM PUMPS.

MACHINISTS' SUPPLIES.

THE STEAM GENERATOR
Manufacturing Company of Penn

This Company is now prepared to furnish

WIEGAND'S



Patent Improved Steam Generator,

Of any power required, upon two weeks' notice. They have been introduced in this city and thoroughly tested, with most satisfactory results, and are sold under Guarantee of Absolute

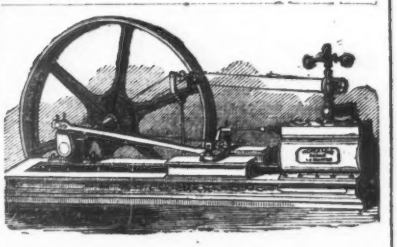
Safety from Destructive Explosion.

They are cheaper in first cost and in expense of erection, more economical in fuel, durable and convenient in use, than any other apparatus for generating steam. For Mining purposes it is unequalled, owing to the facility with which it can be transported and erected.

Office of the Company, 30 North Fifth Street,
Philadelphia, Pa.

Directors—NELSON J. NICKERSON, WALTER J. BUDD EMMOR WEAVER.

NELSON J. NICKERSON, President.
EDWARD H. GRAHAM, Sec. and Treas sep14-1y



TODD & RAFFERTY.

GENERAL

MACHINERY MERCHANTS, ENGINEERS, AND MACHINISTS,

Manufacturers of Stationary and Portable Steam Engines and Boilers; also Flax, Hemp, Tow, Oakum, and

ROPE MACHINERY,
MILL GEARING,
SHAFTING.

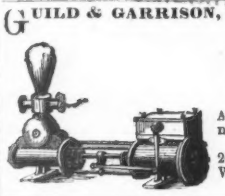
Lathes, Planers, Drills, Chucks, etc. Iron and Brass Castings. Judson & Snow's Patent Governors constantly on hand.

OFFICE AND WAREROOMS, NO. 10 BARCLAY STREET, N. Y.

Office and Works, Paterson, New Jersey.

JOSEPH C. TODD. oct 27-1y PHILIP RAFFERTY.

GUILD & GARRISON, MANUFACTURERS OF



Steam Pumps,
Vacuum Pumps,
Steam Engines,
Vacuum Pans,

And all the various connections. For sale at the STEAM PUMP WORKS, 26, 28 and 30 First street, Williamsburgh, N. Y.
sep14-6m

COAL SHIPPERS.

E. B. ELY & CO., SHIPPERS OF

COAL,

33 TRINITY BUILDING, 111 BROADWAY,
NEW YORK.

"Old Company's" Lehigh, J. H. Swoyer's Enterprise, Wyoming, Wilkesbarre, and Locust Mountain Bituminous Coal.

E. B. ELY,
ap24-1y-q S. W. ELY,

SAMUEL BONNELL, JR., OFFERS FOR SALE his SUGAR CREEK and HONEY BROOK

LEHIGH COALS,

OFFICE:

43 and 45 TRINITY BUILDING, 111 BROADWAY,
NEW YORK. Jan:1y

NOTICE TO MANUFACTURERS AND INVENTORS OF WATER METRES.

The Department of Public Works, City of New York, will, on and after the 20th of August next, be prepared to examine and test the capacity and accuracy of any Water Metre that may be presented to it for that purpose.

WILLIAM M. TWEED,
aug 2.4t Commissioner Public Works.

A NEW 20 HORSE POWER STEAM ENGINE fitted with "Metaline." NO OIL OR GREASE required, for sale by

FRANKLIN E. BRADSHAW,
1mos 61 Broadway, Rooms 26 & 27.

FILE-COVERS. FILE-COVERS. For preserving the numbers of the ENGINEERING AND MINING JOURNAL. Price $1.50. For sale by
WESTERN & CO., 37 Park Row, New York.

THE GREATEST
INDUSTRIAL PUBLICATION IN THE WORLD.

"THE MANUFACTURER & BUILDER."

32 LARGE PAGES
SPLENDIDLY ILLUSTRATED.

It is indispensable to—

EVERY Farmer, Artizan, Architect, Builder, Manufacturer, Mechanic and Tradesman.

NO Professional Man or Retired Gentleman can afford to be without it.

It discourses on the relative value of everything that enters into the construction of Buildings—including iron, wood, stone, brick or concrete; also on limes, cements, mortars, paints, etc., etc.

DO you want to build a House or Barn economically? See *The Manufacturer and Builder!*

DO you want to build a road or tastefully lay out your grounds? See *The Manufacturer and Builder!*

DO you want to put an additional wing on your house, put a new story on your house, or paint your house? See *The Manufacturer and Builder!*

DO you want to know about all the new inventions in labor-saving machines and scientific discoveries in the Industrial Arts? See *The Manufacturer and Builder!*

IT IS A THOROUGHLY PRACTICAL JOURNAL
NOW IN ITS SECOND YEAR.

ARE YOU a manufacturer of Steam Engines Dress Goods, Bricks, Hats, Iron, Furniture, Steel, Carpets, Locomotives, Books, Chemicals, Agricultural Implements, Carriages, Wood or Metal, Household Implements—in fact of ANYTHING. See *The Manufacturer and Builder!*

DON'T Fail to get "THE MANUFACTURER & BUILDER."

32 Pages, 15 cents per Copy. $1.50 a year.

ALL NEWSDEALERS HAVE IT OR WILL GET IT FOR YOU, OR SEND TO US FOR IT.

No One can Estimate its Great Value until they have seen a Copy.

150,000 READERS now testify to its usefulness, and it is pronounced by the press throughout the world to be the "great Newspaper Hit" of the period.

WE WANT EVERYBODY TO SEE IT.
WE WANT EVERYBODY TO TAKE IT.

Send for specimen *free*, get your friends to take it with you and you can have it for a trifle. Address,

WESTERN & COMPANY, Publishers,
(P. O. Box 5969.) 37 Park Row, New York.

1870.

"THE ENGINEERING AND MINING JOURNAL,"

AN ILLUSTRATED WEEKLY PERIODICAL,

Intended to advance the interests of those engaged in ENGINEERING AND MINING, in the widest sense of those terms.

VOLUME IX. COMMENCED JAN 4.

ENGINEERING.

It contains matter of the highest importance to all who are engaged in

CIVIL ENGINEERING, as in the erection of buildings the construction of industrial works, public and private, the surveying and laying out of roads, canals, railroads, etc., and the erection of bridges, docks, etc. Being the recognized official organ of the American Institute of Architects, the various papers on subjects connected with building, which are from time to time read before the Institute, will be published in its columns.

MECHANICAL ENGINEERING, as steam engines, hydraulic motors, the construction of tools, machinery, mill-work, etc.

AGRICULTURAL ENGINEERING, as the application of machinery to agricultural processes, and the improvement of agricultural districts by drainage, and various other operations involving an acquaintance with engineering practices.

HYDRAULIC ENGINEERING, as in the planning and construction of water-works, and the improvement of rivers, harbors, etc.

MINING is a subject that receives equal attention with Engineering. The various interests involved in the mining operations of the country, as

THE COAL TRADE,
THE METAL TRADE,
and MARKET REPORTS,

wherever they affect these subjects, are fully cared for, while the principles which relate to mining, geology mineralogy, chemistry, and metallurgy are carefully elaborated, and all new discoveries relating there promptly detailed. In the practical departments relating to the working and management of mines, whether of gold, silver, copper, lead, iron, coal, slate, marble, stone, oil, salt, etc., will be found, not only the latest news, but a full discussion of the best methods of developing these important interests and bringing their products into marketable shape.

The ENGINEERING AND MINING JOURNAL is not strictly a new periodical, as for nearly four years it has occupied a prominent position in the field of journalism under the title, THE AMERICAN JOURNAL OF MINING, which is now presented re-modeled, improved, and in a new and more attractive form.

CONTRIBUTORS.

Among its Contributors will be found some of the ablest men of the day, and no effort or expense will be spared to make the information conveyed, FRESH, TRUSTWORTHY, AND THOROUGH.

ILLUSTRATIONS.

Subjects requiring the aid of engravings will be fully illustrated by cuts prepared by the best artists. Great pains will be taken in this department.

SUBSCRIPTION.

Subscription price $4 per annum, in advance. Any person sending us the names of four subscribers, with the full subscription rate, $16, will receive an extra copy free.

SINGLE COPIES, TEN CENTS EACH.

☞ Specimen Copies sent free on application to the Publishers. Address,

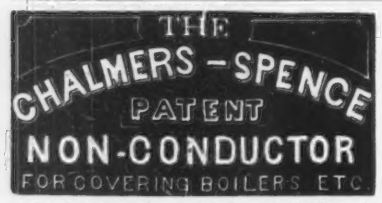
WESTERN & COMPANY,
P. O. Box 5969. 37 Park Row.

News Dealers supplied by the *American News Company*, 121 Nassau St., New York.

Advertisements.

Advertisements admitted on this page at the rate of 40 cents per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

MACHINISTS' SUPPLIES.



Also for protecting Water Pipes and Mains from FROST. This Composition is NON-COMBUSTIBLE. It never DETERIORATES, and will last as long as the boiler or pipe to which it is applied. It saves from 20 TO 30 PER CENT. in fuel according to circumstances. This has been practically demonstrated. Steam passes through ANY LENGTH of piping covered with this Composition QUITE DRY.

Extensively used in the British Navy and by the leading Manufacturers, Shipbuilders, and Steamship Companies of Great Britain and the Continent; and since its introduction in America it has given universal satisfaction. In witness whereof see pamphlet containing names and testimonials, to be had by applying to

THE CHALMERS-SPENCE PATENT
NON-CONDUCTOR COMPANY,
Foot of East Ninth street, E. R., New York.

Or, to Branch Office. J. Chalmers, Manager, 1202 North Second street. St. Louis, Mo.: E. H. Ashcroft, Boston, Agent for New England; L. M. Hart, 522 Walnut street, Philadelphia; F A. Shuck, care of Peterson, Hill & Co. 34 Peter's street, New Orleans. nov. 30-tf

NEW YORK BELTING AND PACKING COMPANY. The oldest and largest manufacturers in the United States of

Vulcanized Rubber Fabrics,

Adapted to Mechanical Purposes,

nvite the attention of all who are interested in the sale or use of such articles to the high standard quality and ow prices of their various manufactures, comprising

Machine Belting, Steam Packing, Leading Hose, Suction Hose, Car Springs, Wagon Springs, Billiard Cushions, Grain Drill Tubes,

etc., etc., etc.,

"TEST" HOSE

made expressly for the use of Steam Fire Engines, and will stand a pressure of 400 pounds per square inch. Officers of Fire Departments requiring new hose, will find this much superior in strength and quality to any other.

PATENT SOLID EMERY VULCANITE WHEELS, a composition of rubber and emery, making a very hard uniform substance of the nature of stone throughout. These wheels for grinding and polishing metals, "gumming" saws, etc., are the most economical and effective tools that can be used.

WAREHOUSE, 37 AND 38 PARK ROW, NEW YORK.
JOHN H. CHEEVER, Treasurer.

☞Price lists and further information may be obtained by mail or otherwise on application.
oct30-1y-os

E. LYON,
MANUFACTURER OF
Patent Portable Hydraulic Jacks and Punches,
NO. 470 GRAND STREET, NEW YORK.

For Raising Heavy Weights, such as Locomotives Boilers, Guns, Heavy Machinery, Wrecking Purposes, putting together Water and Gas Pipes, pushing off Cranks and Propellers, Pulling, Proving Chains and Ropes, setting up Rigging, or Pulling Stumps, Punching and Shearing Iron, Die-Sinking, etc.

☞IMPROVED PATENT HYDRAULIC JACKS, that run out their entire length in a HORIZONTAL or any other position.

PATENT HYDRAULIC PUNCH,
For Punching Iron, Die-Sinking, etc. Ap 12;1y

COOPER'S GLUE AND REFINED GELATINE.

COOPER HEWITT, & CO.,
NO. 17 BURLING SLIP, NEW YORK.
Bar Iron, Braziers' Rods, Wire Rods, Rivet and Machinery Iron, Iron and Steel Wire of all Kinds, Copperas, &c., &c.
RAILROAD IRON, COOPER WROUGHT IRON BEAMS AND GIRDERS,
Semi and Cast-Steel. Gun-Barrel and Component Iron,
PUDDLED AND REFINED CHARCOAL BLOOMS,
Ringwood Anthracite and Charcoal Pig Iron.
Works at Trenton and Ringwood, N. J.
May 17:1y

B. KREISCHER,
New York Fire Brick

AND
STATEN ISLAND
Clay Retort Works.
Established 1845.

Office, 58 Goerck Street, Corner Delancy Street, East River, New York. mar28-1y-q

THE GUTTA-PERCHA AND RUBBER MANUFACTURING CO.,
LATE BENEDICT, TORRY & TWOMBLY, AGENTS,
9 and 11 Park Place, - - - - - - - - - - - - NEW YORK
MANUFACTURERS OF VULCANIZED RUBBER FABRICS, ADAPTED TO MECHANICAL AND MINING PURPOSES,
Rubber Belting, Packing and Hose,
'Patent Combination" Steam Fire Engine Hose

The only Hose that will stand the great pressure and severe tests of Steam Fire Engines without bursting or sweating. Adopted EXCLUSIVELY by the Metropolitan Fire Department of New York, the United States Navy, and recommended to all Fire Departments for adoption throughout the Country by the New York Board of Fire Underwriters. This Hose is CHEMICALLY PREPARED, so as to prevent MILDEW, DRY AND WET ROT, AND ALSO THE DETERIORATION OF THE RUBBER, under Letters Patent, No. 99,935, and other valuable patents.

ALSO SUCTION HOSE, VALVES, GASKETS, STEAM and PETROLEUM OIL HOSE, GUTTA-PERCHA FACTORY BUCKETS,

BEST OAK-TANNED LEATHER BELTING, PAGE'S PATENT LACE LEATHER, &c., &c.
MANUFACTORY, 530 West 25th Street; SALESROOM, 9 and 11 Park Place, near Broadway, NEW YORK.

☞ Price Lists and further information may be obtained by mail or otherwise on application.

P. O. Box 485. May 30:6m
WILLIAM A. TORREY, Manager.
A. C. BENEDICT, Jr., Treasurer.

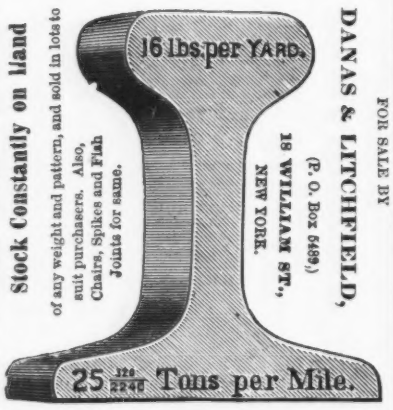
ENGINEERS' SUPPLIES.

Leschot's Patent DIAMOND-POINTED STEAM DRILLS.

The unequalled efficiency and economy of these DRILLING MACHINES are fully established, and they are fast superseding all other inventions for ROCK DRILLING. They are constructed of various sizes and patterns to suit different classes of work, being adapted to Channelling and Gadding in quarries; to Shafting, Tunneling, Prospecting and all open cut work in mines; also to heavy Railroad-grading and Sub-marine Blasting. They operate noiselessly without percussion: and produce a perfectly cylindrical hole of uniform diameter. Their usual rate of boring is three to five (3 to 5) inches per minute in hard rock; eight to ten (8 to 10) inches per minute in slate and sand rock, and eighteen to twenty-two (18 to 22) inches per minute in coal. TEST CORES, in the form of solid cylinders of rock or mineral may be taken out of mines from any depth—not exceeding one thousand (1,000) feet—showing the geological formation, character of mineral deposits, &c. These drills never need sharpening and no steel is consumed in boring—as the cutting points (*composed of rough, uncut diamonds,*) are practically indestructible. Boilers, Engines, Steam Pumps, and all necessary tools furnished with drills. Illustrated Circulars sent on application.

SEVERANCE & HOLT, MANUFACTURERS,
aug11-1y Office, 16 Wall St., New York.

RAILROAD IRON FOR MINES.



Stock Constantly on Hand of any weight and pattern, and sold in lots to suit purchasers. Also, Chairs, Spikes and Fish Joints for same.

DANAS & LITCHFIELD, 18 WILLIAM ST., NEW YORK. (P. O. Box 5693)
FOR SALE BY
25 12/2240 Tons per Mile.
Light Locomotives, for use in Collieries, Mines, etc.
mch13-6m

LECOUNT'S PATENT HOLLOW LATHE DOGS AND CLAMPS.—A set of eight Logs from ¾ to 2-in., inclusive, $8. A set of twelve from ¾ to 4-in., $17.30. Five sizes Machinists' Clamps, from 2 to 6-in., inclusive, $11. Send for Circular. C. W. LeCOUNT, N2:1y South Norwalk, Conn.

LUCIUS W. POND'S NEW TOOLS.
NEW AND IMPROVED PATTERNS—Lathes, Planers, Drills, Milling Machines, Boring Mills, Gear and Bolt Cutters, Punches and Shears for Iron. Office

98 86 98

98 Liberty Street, New York.
☞ Works at Worcester, Mass.
aug4-1y-os S. N. HARTWELL, General Agent.

STEAM ENGINES
FROM 4 TO 500 HORSE-POWER,
Including CORLISS PATENT CUT-OFF ENGINES, SLIDE VALVE STATIONERY ENGINES, and PORTABLE ENGINES. Also, IMPROVED CIRCULAR SAW MILLS, etc.
Send for Descriptive Circular and Price List.
WOOD & MANN STEAM ENGINE CO.,
UTICA N. Y.
Warerooms, 42 Cortlandt Street, New York; and 201 and 203 South Water Street, Chicago, Ill.
nov7-1y-os

ENGINEERS' SUPPLIES.

THE BEST TURBINE WHEEL.
SWAIN'S

Gave 5 **Per Cent.** better results at the **Lowell Test** than any of its **Highly Polished Competitors.**

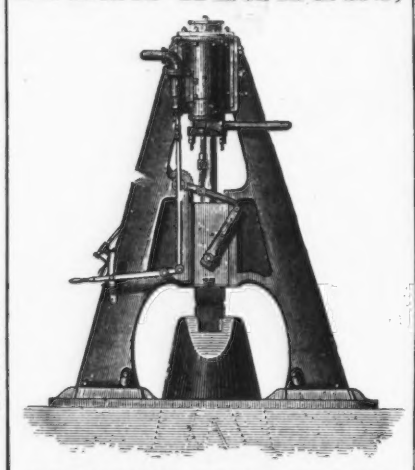
It will give from 30 to 100 per cent. more power, in proportion to its size, than any other wheel.

Guaranteed to give from 10 to 50 per cent. more power, with the same water, than any other wheel in the market. It is the best made, most compact, runs longer without repairs, and gives better satisfaction than any other wheel.

☞ Send for report of tests, with description and diagrams.

SWAIN TURBINE CO.,
June 7:6m North Chelmsford, Mass.

WM. A. SWEET & CO., NO. 33 WYOMING STREET, SYRACUSE, N. Y.,
MANUFACTURERS OF
STEAM-HAMMERS,



ELLIPTIC SPRINGS, CAST-STEEL CROWBARS.
Sweet's Celebrated Steel Tire, and Cast-Steel Sleigh and Cutter Shoes. nov. 16:6m

MERRICK & SONS'
Southwark Foundry,
NO. 430 WASHINGTON AVENUE, PHILADELPHIA.
William Wright's Patent Variable Cut-Off Steam Engine, regulated by the Governor. Merrick's Safety Hoisting Machine, Patented June, 1868. David Joy's Patent Valveless Steam Hammer. D. M. Weston's Patent Self-Centering, Self-Balancing Centrifugal Sugar Draining Machine, and Hydro Extractor for Cotton and Woolen Manufacturers. ju28tf

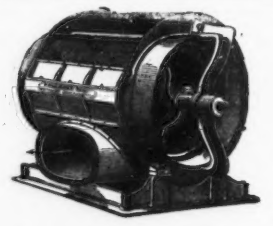
GUNPOWDER PILE-DRIVER—THOMAS SHAW PATENT.—The Company are prepared to sell rights, or machines, or will contract for driving piles quicker and better than it can be done by any other machine.
Fifty Blows Per Minute and no Crushing or Shattering.
For description and illustration see this Journal of August 17,th, Vol 8, No. 7. Address
GUNPOWDER PILE-DRIVER,
aug 21-1y o. Nos. 505 Minor street, Philadelphia.

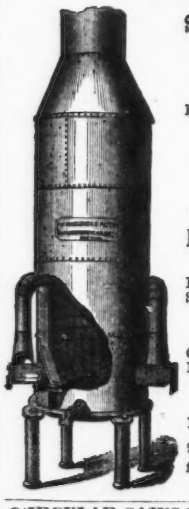
GUN-POWDER
THE LAFLIN & RAND POWDER CO., 170 BROADWAY, NEW YORK, deliver Mining, Blasting, and Sporting Powder, from their Agencies in all parts of the United States, and their Works at Kingston, Newburg, Saugerties, and Catskill, N. Y., Pottsville, Carbondale, and Scranton, Pa., Baltimore, Md., and Platteville, Wis.
☞ Safety Fuse at Wholesale. nov 2:1y

FOR SALE—A FIRST-CLASS 10-STAMP MILL, California pattern, with twenty-five horse-power engine and thirty horse-power boiler, new and in good condition. For particulars and terms, address "STAMP-MILL," care of the ENGINEERING AND MINING JOURNAL. nov. 9:tf. o.s.

MISCELLANEOUS.

MOUNT SAVAGE FIRE BRICK
GOVERNMENT STANDARD.
Manufactured by the
Mount Savage Fire Brick and Mining Company.
This Company having acquired the Fire Clay properties and Brick Works of the
Consolidation Coal Company,
will receive orders for their unequalled FIRE BRICK for Blast, Puddling, Smelting and Glass furnaces. Diagrams of shapes and prices will be furnished on application to
J. S. MACKIE, Pres., 71 Broadway, New York.
JAMES A. MILLHOLLAND, Vice Pres.,
Dec. 7.tf Mount Savage, Maryland.





SMITH & SAYRE
MANUFACTURING CO.,
PROPRIETORS AND MANUFACTURERS OF THE
Mackensie Patent
BLOWER and CUPOLA and SMELTING FURNACE.
Also, Mackensie's Patent GAS EXHAUSTER and COMPENSATOR. Address
SMITH & SAYRE
MANUFACTURING COMPANY,
95 Liberty street, N. Y. Send for illustrated phamphlet.
Mar26-1y

CIRCULAR SAWS WITH EMERSON'S PATENT MOVEABLE TEETH.

These Saws are meeting with unprecedented success, and their great superiority over every other kind, both as to efficiency and economy, is now fully established
Also,
SON'S PATENT PERFORATED CIRCULAR AND LONG SAWS,
(All Gumming avoided,) and
EMERSON'S PATENT ADJUSTABLE SWAGE,
for Spreading, Sharpening, and Shaping the teeth of all Saws. Price, $5. Manufactured by the
AMERICAN SAW COMPANY
Office No. 2 Jacob St., near Ferry St., New York.
Factory, Trenton, N. J. Branch Office for Pacific Coast, No. 606 Front St., San Francisco, Cal.
Send for new Descriptive Famphlet and Price List.
july1-1y

DUNCAN, SHERMAN & CO.,
BANKERS,
Corner of Pine and Nassau Streets, New York.
Issue Circular Notes and Letters of Credit for Travelers, available in all the Principal Cities in the World.

TRANSFERS OF MONEY TO EUROPE AND THE PACIFIC COAST BY TELEGRAPH.
☞Interest allowed on Deposits. feb-1y

E. F. DUNNE,
Attorney and Counsellor at Law,
1301 F STREET, WASHINGTON, D. C.,
PACIFIC COAST.—Will practice in all the Federal Courts. Specialty in Patents for Lands, Mines, and Town-Sites. mar15-1y

AGENTS AND CANVASSERS WANTED
IN EVERY CITY AND TOWN IN THE UNITED STATES,
FOR THE
Engineering and Mining Journal.
Liberal inducements. Specimens sent free. Address
WESTERN & COMPANY,
37 Park Row. New York.

MICROSCOPES FOR SCIENTIFIC INVESTIGATIONS and Educational Purposes. Price list sent free. T. H. McALLISTER, Optician, Dec21-6m 49 Nassau street, N. Y.